



STIC EIC 2100 Search Request Form

111882

Today's Date:

1/12/2004

What date would you like to use to limit the search?

Priority Date: 6/30/2000 Other:

Name Kathy Takeguchi

AU 2187 Examiner # 79748

Room # 2R03 Phone (703) 305-8115

Serial # 09/007,300

Format for Search Results (Circle One):

PAPER DISK EMAIL

Where have you searched so far?

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A "Fast & Focused" Search is completed in 2-3 hours (maximum). The search must be on a very specific topic and meet certain criteria. The criteria are posted in EIC2100 and on the EIC2100 NPL Web Page at <http://ptoweb/patents/stic/stic-tc2100.htm>.

What is the topic, novelty, motivation, utility, or other specific details defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, definitions, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract, background, brief summary, pertinent claims and any citations of relevant art you have found.

Advantages & Properties of Storage Area Network (SAN)
interconnects & fabric

- ↓
1. Fibre Channel
 2. Infiniband
 3. PCI
 4. Local Area Network (LAN) or ethernet

STIC Searcher Geoffrey St. Leger Phone 308-7808

Date picked up 1/12/4 Date Completed 1/12/4





STIC Search Report

EIC 2100

STIC Database Tracking Number: 111882

TO: Kathy Takeguchi
Location: 2R03
Art Unit : 2187
Monday, January 12, 2004

Case Serial Number: 09/607300

From: Geoffrey St. Leger
Location: EIC 2100
PK2-4B30
Phone: 308-7800

geoffrey.stleger@uspto.gov

Search Notes

Dear Examiner Takeguchi,

Attached please find the results of your search request for application 09/607300. I searched Dialog's technical databases, product announcement files and general files; along with the Internet.

Please let me know if you have any questions.

Regards,

Geoffrey St. Leger
4B30/308-7800

01683557 03-34547

The next frontier

Gordon, Bruce

Communications News v35n8 PP: 46 Aug 1998 ISSN: 0010-3632 JRNL CODE:
CNE

DOC TYPE: Journal article LANGUAGE: English LENGTH: 1 Pages

WORD COUNT: 721

ABSTRACT: One of the promises of storage area networks (SAN) is connectivity advantages for networks with performance advantages over traditional storage channels. Enterprise storage must be flexible. Advantages of basic fibre channel arbitrated loop over parallel SCSI channels include: 1. higher data throughput, 2. greater scalability, and 3. expanded connectivity options. A key attribute for flexible enterprise storage is modularity. To gain the full value of a storage network, various parts of each of these components should plug and play in a modular fashion. Storage networks can benefit from a common management environment that includes: 1. configuration management, 2. fault management, and 3. performance management.

TEXT: Headnote:

Storage area networks promise connectivity, performance advantages over traditional storage channels.

The opportunity realized from storage networks is an order-of-magnitude improvement in information access. That's why the industry is buzzing about storage area networks (SANs) based on industry-standard fibre channel technology. Given all the buzz, keep in mind the SAN premise (or promise): connectivity advantages for networks with performance advantages over traditional storage channels.

COMPLEXITY-A KEY CONCERN

One of the realities we face in this everchanging, high-tech realm of information management is complexity. Complexity in the enterprise is driven largely by an insatiable appetite for new, competitive business applications and the reluctance to shed legacy applications. Technologies such as UNIX, open systems, relational databases, and client/server applications have given organizations the opportunity to create competitive advantage based on information. The emergence of data warehousing, Web, and multimedia applications, clusters, and year-2000-upgrade applications are placing additional demands on over-taxed IT resources. Employees in branch offices and retail locations expect the same level of information access and application support that is available at the home office.

As businesses add new software application packages, the demands placed on storage increase and diverge. The enterprise can no longer be satisfied by a single, generic storage solution. Enterprise storage must provide a tailored solution for each application, at every location, and with any level of capacity, performance, and connectivity. In other words, enterprise storage must be flexible. For enterprise storage, this means adopting a new approach and a new architecture.

FIBRE CHANNEL-THE BASE TECHNOLOGY

Fibre channel was designed to provide the combined benefits of SCSI/channel and network technologies. In network terms, a single fibre channel arbitrated loop (FC-AL) is analogous to a network segment. Compared with preceding parallel SCSI channels, basic FC-AL provides:

Higher data throughput with up to 5x more bandwidth over SCSI; Greater scalability, addressing up to 7x more disk drives per channel; Greater distances between servers and storage pools with cabling lengths increased more than 20x (multi-mode) or 400x (single-mode); and Expanded connectivity options based on fibre channel hubs and switches. However, fibre channel

technology in and of itself is of little value. Integration with heterogeneous host platforms, storage subsystems, and network switches (called fabric in fibre channel-ese), and a management framework are all necessary in order to gain benefit from these technical specifications.

FLEXIBILITY THROUGH MODULARITY

A key attribute for flexible enterprise storage is modularity. Consider the LAN analogy. A typical LAN may include a large legacy server for transaction processing, a Windows NT server for email and Web access, a Novell server for file storage, and perhaps a Unix system for data-warehouse applications. Each of these boxes is tailored for its particular application, and multiple servers of various sizes may be located around the world in order to meet local processing requirements.

Storage networks must have equal flexibility. Hardware configurations must be tailorable for each unique application and its associated number of users. Some key metrics are disk capacity, random read/write operations/second, sustained read/write bandwidth, and the level of redundancy/availability required. A broad range of price and performance options should be possible by combining differing numbers of disk drives, storage processors, hubs, or switches, etc. To gain the full value of a storage network, various parts of each of these components should "plug and play" in a modular fashion. To provide investment protection, the ability to re-deploy or reconfigure subsystems and components as application requirements change must be provided.

MANAGING INFORMATION STORAGE

LANs and WANs are often managed using a common framework. Storage networks can benefit similarly from a common management environment that includes:

Configuration management-creation of logical disks, assignment to specific servers, etc.;

Fault management-notification of internal staff or maintenance personnel; Performance management-threshold monitoring, cache enablement, etc.; Business impact management-organize disks or arrays by business function to track health and service levels, performance, and status on departmental or divisional levels; and

Capacity planning-application performance, hardware utilization ratios, and overall array throughput tracking.

By making open storage network compatibility a key near-term investment criterion, users can be confident of longterm investment protection. Open platform support, modular plug-and-play components, and centralized management of distributed storage pools will all play a key part in delivering the value of this next technology frontier.

Gordon is the market development manager at CLARiiON Advanced Storage Solutions, Southboro, Mass.

Circle 322 for more information

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DESCRIPTORS: Computer networks; Information storage; Technological change;
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CLASSIFICATION CODES: 9190 (CN=United States); 5250 (CN=Telecommunications systems)

02342687 SUPPLIER NUMBER: 56479100 (THIS IS THE FULL TEXT)
SCSI still kicking in bus battle. (Technology Information)
Lelii, Sonia R.
PC Week, 1
Oct 18, 1999
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TEXT:

It's the second coming of SCSI.

In the coming weeks, a half-dozen computer and component manufacturers plan to introduce network adapters, hard drives and workstations equipped with Ultra 160 SCSI, the latest iteration of the bus interface technology that will leapfrog Fibre Channel's data transfer speeds.

The jury is still out, however, on whether Ultra 160 SCSI will draw enough backers to halt the momentum behind the emerging Fibre Channel interconnect technology.

The Ultra 160 SCSI technology, part of the Ultra3 SCSI standard that was approved last year, provides several benefits over Fibre Channel, SCSI advocates say. SCSI is a mature technology that some experts say is easier to configure than Fibre Channel. The new SCSI standard is also compatible with older versions of the technology.

One major advantage of the new SCSI is speed: Devices using the interface should be able to transfer data at 160MB per second; that figure could double in 2001. Fibre Channel's current top transfer rate is 100MB per second, a rate that should reach 200MB per second next year.

"The idea that SCSI could not grow is not true," said Jerry Namery, chief technology officer at Winchester Systems Inc., a storage device maker in Woburn, Mass.

"What people forget is that SCSI's performance keeps doubling every two years," Namery added.

Fibre Channel's main advantage is its ability to extend to 50 kilometers or more, while SCSI is limited to a few hundred meters. Distance is a critical feature for storage area networks.

In addition, each Fibre Channel loop can hook up to 126 devices, while each SCSI channel can connect to only 15 devices.

Because of those limitations, some analysts expect sales of Fibre Channel products to continue growing faster than sales of SCSI devices. International Data Corp., of Framingham, Mass., forecasts that Fibre Channel hard drive sales will rise at a compounded annual growth rate of 138.5 percent and reach 11.4 million units sold in 2003, while SCSI drive sales will inch up at 6.1 percent annually, with shipments in 2003 of 16.7 million units.

Despite the slower-growth predictions, some vendors are betting that Ultra 160 SCSI will catch on at many IT organizations. Upcoming announcements include the following:

- Mylex Corp. this week will announce two new controllers-the enterprise-level Extreme RAID 2000 and the entry-level AccelaRAID 352.
- Hewlett-Packard Co. plans to introduce in the coming weeks the HP Kayak XU800 PC workstation, which will integrate one of Adaptec Inc.'s Ultra 160 SCSI host bus adapters.
- Dell Computer Corp. is readying a new workstation with support for Ultra 160 SCSI.
- Seagate Technology Inc., Fujitsu Computer Products of America Inc. and Quantum Corp. all plan to introduce new Ultra 160 SCSI hard drives at Comdex in Las Vegas next month.
- IBM announced last week its Ultrastar family of disk drives.
- QLogic Corp. last week unveiled a series of hard drive controller chips and host bus adapters that support the SCSI standard.

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Although Ultra 160 SCSI is still evolving, some IT managers are already high on the technology.

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While Wallace is considering Fibre Channel, he is finding SCSI less expensive. And he's not skittish about the untested Ultra 160 technology.

"Implementing Ultra 160 SCSI' won't be any more dangerous than jumping on the Fibre Channel bandwagon," he said.

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Storage Networks start to converge. NAS gains momentum and respect

Moore, Fred

Computer Technology Review v20n4 PP: 1, 28+ Apr 2000 ISSN: 0278-9647

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DOC TYPE: Periodical; News LANGUAGE: English RECORD TYPE: Fulltext

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ABSTRACT: The dynamics of the storage industry are changing at an unprecedented pace. A new millennium begins with annual spending on IT exceeding \$1 trillion signaling to everyone that change is (or should be) a core competency of the information age. Today, many new concepts are seen unfolding that were looked at quite differently by most of the industry less than a year ago. Four new waves (at least) have captured significant momentum in a very short time. The NAS evolution has shifted from being considered as a niche storage alternative for low-end networks to a serious storage solution for a much larger network. File management systems and software, SAN, and storage outsourcing are also discussed.

TEXT: The dynamics of the storage industry are changing at an unprecedented pace. A new millennium begins with annual spending on IT exceeding \$1 trillion signaling to us all that change is (or should be) a core competency of the information age. Today, we see many new concepts unfold that were looked at quite differently by most of the industry less than a year ago. A year ago, would we have thought that NAS would be as attractive and scale as high as it now does? Would we have thought that xGigE from the bottom and the new Infiniband channel-based switched fabric technology from the top would squeeze Fibre Channel and offer legitimate alternatives? Could we have seen that new service providers would make the notion of outsourcing our most valuable IT asset, our data, a proposition that we could seriously entertain? Four new waves (at least) have captured significant momentum in a very short time.

NAS Is Gaining Momentum

The NAS evolution has shifted from being considered as a niche storage alternative for low-end networks to a serious storage solution for a much larger market. The differences between SAN and NAS stood out a year ago when the role of a NAS seemed secondary at best. NAS is now forecasted to grow at over 60% in revenue per year and approach \$7B in annual revenue by yearend 2003.

The ever-increasing focus on storage has advanced the NAS industry significantly. NAS provides an increase in file serving performance by offloading much of the I/O traffic from the application server while offering easier administration of the storage pool. The opportunity for NAS improves further by offering a non-disruptive storage solution to the existing network with minimum staff training required. Storage devices can be added quickly without the presence of a host server. NAS clearly simplifies the IT manager's life considerably. Costly server upgrades to software and hardware occurs less frequently and can be avoided.

NAS should not be viewed as competition for SAN, but has now established itself as a complementary solution for block data. NAS also uses network interfaces such as Ethernet positioning it for the imminent xGigE bandwidth boom. NAS sales are expected to double in 2000 and the market may grow even faster as solutions scale further and add functionality.

File Management Systems And Software Are Keys

Software for network storage management is clearly the critical path item needed to enable the power of the network/storage cataclysm. As organizations turn to more open computing systems for business critical computing, achieving mainframe class reliability, availability, and performance becomes the grand prize. Standards are being pushed more

quickly than before, though vendors still too often view open systems as a threat to their proprietary offerings. Distributed file management systems are gaining increased interest and visibility as they represent the building blocks for a more complete storage management solution. Systems providing intelligent file I/O versus block I/O have gained considerable momentum. Domain fault-tolerance (spanning RAID across multiple arrays), dynamically spreading and balancing I/O across newly added disks, assigning RAID levels by object or volume, and adding storage non-disruptively represent required functionality going forward.

The true SAN market, in particular, is growing no faster than the pace that SAN management software becomes available. Whereas NAS is essentially a plug-and-play solution, the successful SAN requires access software and control software to function properly and fulfill its promise. SAN access software enables the application to use and manipulate the data on a SAN. LUN management, zoning, and locking are examples of access software. SAN control software provides storage resource management, data protection, device performance, and capacity monitoring. A great deal of work in the SAN software area remains to be completed. The location of the SAN software framework is one of the great debates today as the location of the "SAN brains" remains unresolved.

The SAN Fabric Changes

Fibre channel was the hot topic in 1997-1998, then SANs dominated industry talk in 1999. The discussion about the SAN brains aside, the recent activity on the future of I/O interfaces has risen to the top. A SAN over IP? IP is easily the dominant data network protocol and the basis of the global Internet. Ethernet is the basis of roughly 90% of all LANs worldwide. What does this mean? Where does Infiniband fit in this picture? These rapidly emerging trends suggest a convergence or unification of the LAN, WAN, and SANs. Infiniband is a new bus architecture essentially planned to replace the NGIO, PCI, and PCI-X protocols most commonly used for server clustering, internal memory, and bus I/O transfers. It is not available today, though it has recently gained considerable support. Availability is a few years away. The goals of Infiniband (over fiber) include much higher reliability, availability, and scalability increasing crossconnected bandwidth and scaling faster than microprocessors are scaling. Infiniband will conceivably grow from a server interconnect technology and scale to the point where server architecture meets the switched fabric. The switched fabric looks more like an IP-based SAN every passing day. TCP is also the preferred protocol for most new applications. The simplest way to scale an enterprise backbone is to scale Ethernet. The xGigE progression is gaining steam as it leverages the huge installed base of Ethernet. Ethernet first appeared in 1982 with a rated speed of 10Mbps. We will see 10Gbps in the late 2000-2001 timeframe. Discussions about OC-768 are underway. The momentum for xGigE and now Infiniband appear to be squeezing Fibre Channel from both ends. The debate around whether Fibre Channel over IP (the FC tunnel) will become the longterm SAN protocol will heat up as the year goes forward.

Storage Outsourcing Arrives

New service providers appeared in force in 1999. ISPs (Internet Service Providers), ASPs (Application Service Providers), and most recently the SSP (Storage Service Provider) are all forms of what has been called outsourcing. The SSP model treats storage (this means outsourcing your data) as a service based on the reality that the personnel pool of trained storage expertise is not growing and, therefore, storage is not or will not be a core competency for many businesses. Most companies rarely realize the impact IT talent shortages have on their IT function. Insufficient resources, as well as, (obviously) rapidly changing technologies make storage difficult to understand and manage. How many companies have a true storage talent pool? Why not consider outsourcing storage and have it backed by Service Level Agreements?

Eliminating storage from an organization can often allow more focus on the core competencies. The SSP energy comes from accelerating storage growth as annual growth estimates range from 60-100% with only guesses for the dot-com growth factor. The cost per megabyte of storage falls between 30%

and 40% annually. The cost of managing disk storage today can be as much as ten times greater than disk hardware costs. The expenses associated with backup/recovery software, SRM (Storage Resource Management) software, tuning tools, and potentially more hardware add up quickly. Finally, the SAN model works particularly well for the SSP. The concept of a metroSAN using a very wide bandwidth fiber backbone enables both lowlatency data (online applications) and high-latency data (backup/archive) to be outsourced. Long distance optical fiber can extend the SAN beyond the walls of the business and offer lower management expenses due to consolidation and the associated economies of scale. No longer a future discussion, storage outsourcing has arrived.

Converging To Zero

The dynamic changing storage industry is actually part of a much bigger overall moving picture. In the next five years, we will see the "zero convergence factor" change the dimensions and the landscape again and again. We know that storage prices per unit are basically headed toward zero in the next few years. We also observe that CPU prices are headed to zero in a slightly longer timeframe. Global bandwidth, now increasing at a rate of 10x per year, is beginning a pricing slope that will have the price of broadband near zero per unit in a still slightly longer timeframe. Where will the IT focus be in five years when storage, compute power, and bandwidth all get to essentially zero cost? Where will the value be? Change is inevitable. Expect lots of it.

THIS IS THE FULL-TEXT. Copyright West World Publications, Inc. Apr 2000
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DESCRIPTORS: Storage area networks; Technological change; Convergence
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InfiniBand--a look ahead

Heil, Tom

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DOC TYPE: Periodical; News LANGUAGE: English RECORD TYPE: Fulltext

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ABSTRACT: The leaders in the Intel Architecture and RISC-Unix open systems markets have come together to define InfiniBand, a Switched Fabric I/O Standard slated to replace the shared bus for attaching I/O to servers. A switched fabric connects processor and I/O nodes via a network of switches and point-to-point links.

TEXT: The leaders in the Intel Architecture (IA) and RISC-Unix open systems markets have come together to define InfiniBand, a Switched Fabric I/O Standard slated to replace the shared bus for attaching I/O to servers. A switched fabric connects processor and I/O nodes via a network of switches and point-to-point links. The shift from bus to fabric is a profound reset of server architecture with farreaching implications for the way systems are designed, built, and sold. The promise is enduser systems that are simpler, cheaper, more reliable, and easier to expand and service.

The leaders of the open systems market backed InfiniBand, which might imply broad adoption of InfiniBand as a PCI replacement. It will happen quickly. What could go wrong? Surprisingly, the answer is plenty. Getting InfiniBand defined and working is just the first step. Then, comes the real workreplacing PCI. Economics will shape the outcome and the bus may prove surprisingly resilient.

Today's Bus-Based Server Architecture

A brief review of today's server architecture, depicted in Fig 1, provides a reference in which to understand InfiniBand. The basic building block is an uni-processor or Symmetric Multiprocessor server, functioning either stand-alone or as a node in a multi-server cluster. Cluster configurations are increasingly used in data center, ISP, and electronic commerce applications. The server node consists of CPUs, memory, and I/O bridges, connected via a proprietary memory bus or crossbar. The I/O bridges implement one or more PCI (or PCI-X) segments, each supporting one to five I/O slots. (The higher the segment frequency, the fewer the slots.)

Fig 1 depicts the three main server I/O functions: external communications (e.g., the Internet), data storage and retrieval, and, in the case of a cluster, server-to-server InterProcessor Communications (IPCs). Typically, all are implemented via PCI adapters, using either a Host Adapter Board (HAB) or chip on the motherboard.

A wide variety of PCI HABs exists because of the wide variety of external communications interfaces such as Ethernet, Ti, and ATM. HABs attach the server to LAN/WAN infrastructure elements like switches and routers. Storage is a bit simpler. Two interfaces, SCSI and Fibre Channel, dominate the IA and RISC/Unix server markets. A SCSI or PCI RAID adapter connected directly to hard drives may suffice in a small, standalone server. Fig 1 depicts Fibre Channel HABs connected to a SAN.

IPC networks vary significantly, depending on cluster usage. In the simplest case, a point-to-point Ethernet link is used to exchange heartbeat messages in a two-node availability cluster (each backs the other in case one fails). Generally, however, multiple servers must work together effectively on parallel or partitioned applications, which puts tremendous demands on the IPC network in terms of data throughput and server-to-server message latency. These demands are beyond the capability of standard LAN technologies.

Unlike LAN/WAN and storage, there has been little in the way of broadly adopted IPC standards or third-party merchant solutions. OEMs have, instead, relied on internally developed solutions like Compaq's ServerNet. Recently, the Virtual Interface (VI) standards initiative defined an architecture that allows applications on different server nodes to exchange messages and data directly without going through the operating system, eliminating much of the overhead associated with standard LAN protocols. VI has been mapped to a variety of hardware layers. Also, third-party solutions explicitly targeting cluster IPC are beginning to surface. One example is GigaNet's cLAN (for Cluster LAN) family, a line of VI-based PCI HABs and switches.

Switched fabrics are not new. Fibre Channel, ServerNet, and CLAN are all switched fabrics. Proprietary fabrics have existed in enterprise markets for years. The InfiniBand vision, though, is much broader than that of any of its switched-fabric predecessors.

Tomorrow's InfiniBand Switched Fabric Architecture

Now, compare Fig 1 with the InfiniBand architecture depicted in Fig 2. The first thing to notice is that there are no PCI slots or HABs. An InfiniBand bridge has replaced the PCI bridge in the host chipset. The server has collapsed to nothing more than processors, memory, and InfiniBand I/O ports. (Each server node needs local I/O like boot drives to function.)

To replace PCI, InfiniBand must, by definition, be a true unified systems area network, not just a Storage Area Network like Fibre Channel. Like PCI, a unified network can transport any/all traffic types: LAN/WAN, cluster IPC, and storage. A user may allocate specific InfiniBand channels to specific functions, but it's a configuration rather than a technology choice.

The nature of buses is such that PCI slots and HABs must physically reside in the server enclosure with CPUs and memory. In contrast, InfiniBand decouples I/O from the server. The PCI HAB is replaced by the Target Channel Adapter (TCA) board, which plugs into a switched fabric, rather than a shared bus backplane. TCAs do not have to physically reside in the server enclosure. Separate enclosures just for TCAs, especially in rack mount environments, will emerge. Of course, standalone servers with everything in one cabinet will continue to exist, but it will become a packaging choice.

In contrast to PCI, InfiniBand is defining TCA slots and boards for easy, onedimensional insertion and removal. This will allow boards to be added and removed without having to open the enclosure, similar to the way individual drives are accessible in a disk array.

In some cases, there will be no need for a host or target board-level adapter at all. In Fig 2, no adapter exists between the server host chipset and the RAID system or LAN switch with a native InfiniBand interface. This will become increasingly true as the InfiniBand market matures.

Fig 1

Fig 2

Tom Heil is the senior systems architect for the storage components division at LSI Logic (Fort Collins, CO).

www.lsillogic.com

This article is the first in a three-part series. The second part will appear in the May issue of CTR.

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Intel Corp (DUNS:04-789-7855 TICKER:INTC SIC:3674)

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SCSI still kicking in bus battle. (Technology Information)
Lelii, Sonia R.
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The next frontier

Gordon, Bruce

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The opportunity realized from storage networks is an order-of-magnitude improvement in information access. That's why the industry is buzzing about storage area networks (SANs) based on industry-standard fibre channel technology. Given all the buzz, keep in mind the SAN premise (or promise): connectivity advantages for networks with performance advantages over traditional storage channels.

COMPLEXITY-A KEY CONCERN

One of the realities we face in this everchanging, high-tech realm of information management is complexity. Complexity in the enterprise is driven largely by an insatiable appetite for new, competitive business applications and the reluctance to shed legacy applications. Technologies such as UNIX, open systems, relational databases, and client/server applications have given organizations the opportunity to create competitive advantage based on information. The emergence of data warehousing, Web, and multimedia applications, clusters, and year-2000-upgrade applications are placing additional demands on over-taxed IT resources. Employees in branch offices and retail locations expect the same level of information access and application support that is available at the home office.

As businesses add new software application packages, the demands placed on storage increase and diverge. The enterprise can no longer be satisfied by a single, generic storage solution. Enterprise storage must provide a tailored solution for each application, at every location, and with any level of capacity, performance, and connectivity. In other words, enterprise storage must be flexible. For enterprise storage, this means adopting a new approach and a new architecture.

FIBRE CHANNEL-THE BASE TECHNOLOGY

Fibre channel was designed to provide the combined benefits of SCSI/channel and network technologies. In network terms, a single fibre channel arbitrated loop (FC-AL) is analogous to a network segment. Compared with preceding parallel SCSI channels, basic FC-AL provides:

Higher data throughput with up to 5x more bandwidth over SCSI; Greater scalability, addressing up to 7x more disk drives per channel; Greater distances between servers and storage pools with cabling lengths increased more than 20x (multi-mode) or 400x (single-mode); and Expanded connectivity options based on fibre channel hubs and switches. However, fibre channel

Technology in and of itself is of little value. Integration with heterogeneous host platforms, storage subsystems, and network switches (called fabric in fibre channel-ese), and a management framework are all necessary in order to gain benefit from these technical specifications.

FLEXIBILITY THROUGH MODULARITY

A key attribute for flexible enterprise storage is modularity. Consider the LAN analogy. A typical LAN may include a large legacy server for transaction processing, a Windows NT server for email and Web access, a Novell server for file storage, and perhaps a Unix system for data-warehouse applications. Each of these boxes is tailored for its particular application, and multiple servers of various sizes may be located around the world in order to meet local processing requirements.

Storage networks must have equal flexibility. Hardware configurations must be tailorable for each unique application and its associated number of users. Some key metrics are disk capacity, random read/write operations/second, sustained read/write bandwidth, and the level of redundancy/availability required. A broad range of price and performance options should be possible by combining differing numbers of disk drives, storage processors, hubs, or switches, etc. To gain the full value of a storage network, various parts of each of these components should "plug and play" in a modular fashion. To provide investment protection, the ability to re-deploy or reconfigure subsystems and components as application requirements change must be provided.

MANAGING INFORMATION STORAGE

LANs and WANs are often managed using a common framework. Storage networks can benefit similarly from a common management environment that includes:

Configuration management-creation of logical disks, assignment to specific servers, etc.;

Fault management-notification of internal staff or maintenance personnel; Performance management-threshold monitoring, cache enablement, etc.; Business impact management-organize disks or arrays by business function to track health and service levels, performance, and status on departmental or divisional levels; and

Capacity planning-application performance, hardware utilization ratios, and overall array throughput tracking.

By making open storage network compatibility a key near-term investment criterion, users can be confident of longterm investment protection. Open platform support, modular plug-and-play components, and centralized management of distributed storage pools will all play a key part in delivering the value of this next technology frontier.

Gordon is the market development manager at CLARiiON Advanced Storage Solutions, Southboro, Mass.

Circle 322 for more information

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02020815 53637624

Storage Networks start to converge. NAS gains momentum and respect

Moore, Fred

Computer Technology Review v20n4 PP: 1, 28+ Apr 2000 ISSN: 0278-9647

JRNL CODE: CTN

DOC TYPE: Periodical; News LANGUAGE: English RECORD TYPE: Fulltext

LENGTH: 3 Pages

SPECIAL FEATURE: Photograph

WORD COUNT: 1372

ABSTRACT: The dynamics of the storage industry are changing at an unprecedented pace. A new millennium begins with annual spending on IT exceeding \$1 trillion signaling to everyone that change is (or should be) a core competency of the information age. Today, many new concepts are seen unfolding that were looked at quite differently by most of the industry less than a year ago. Four new waves (at least) have captured significant momentum in a very short time. The NAS evolution has shifted from being considered as a niche storage alternative for low-end networks to a serious storage solution for a much larger network. File management systems and software, SAN, and storage outsourcing are also discussed.

TEXT: The dynamics of the storage industry are changing at an unprecedented pace. A new millennium begins with annual spending on IT exceeding \$1 trillion signaling to us all that change is (or should be) a core competency of the information age. Today, we see many new concepts unfold that were looked at quite differently by most of the industry less than a year ago. A year ago, would we have thought that NAS would be as attractive and scale as high as it now does? Would we have thought that xGigE from the bottom and the new Infiniband channel-based switched fabric technology from the top would squeeze Fibre Channel and offer legitimate alternatives? Could we have seen that new service providers would make the notion of outsourcing our most valuable IT asset, our data, a proposition that we could seriously entertain? Four new waves (at least) have captured significant momentum in a very short time.

NAS Is Gaining Momentum

The NAS evolution has shifted from being considered as a niche storage alternative for low-end networks to a serious storage solution for a much larger market. The differences between SAN and NAS stood out a year ago when the role of a NAS seemed secondary at best. NAS is now forecasted to grow at over 60% in revenue per year and approach \$7B in annual revenue by yearend 2003.

The ever-increasing focus on storage has advanced the NAS industry significantly. NAS provides an increase in file serving performance by offloading much of the I/O traffic from the application server while offering easier administration of the storage pool. The opportunity for NAS improves further by offering a non-disruptive storage solution to the existing network with minimum staff training required. Storage devices can be added quickly without the presence of a host server. NAS clearly simplifies the IT manager's life considerably. Costly server upgrades to software and hardware occurs less frequently and can be avoided.

NAS should not be viewed as competition for SAN, but has now established itself as a complementary solution for block data. NAS also uses network interfaces such as Ethernet positioning it for the imminent xGigE bandwidth boom. NAS sales are expected to double in 2000 and the market may grow even faster as solutions scale further and add functionality.

File Management Systems And Software Are Keys

Software for network storage management is clearly the critical path item needed to enable the power of the network/storage cataclysm. As organizations turn to more open computing systems for business critical computing, achieving mainframe class reliability, availability, and performance becomes the grand prize. Standards are being pushed more

quickly than before, though vendors still too often view open systems as a threat to their proprietary offerings. Distributed file management systems are gaining increased interest and visibility as they represent the building blocks for a more complete storage management solution. Systems providing intelligent file I/O versus block I/O have gained considerable momentum. Domain fault-tolerance (spanning RAID across multiple arrays), dynamically spreading and balancing I/O across newly added disks, assigning RAID levels by object or volume, and adding storage non-disruptively represent required functionality going forward.

The true SAN market, in particular, is growing no faster than the pace that SAN management software becomes available. Whereas NAS is essentially a plug-and-play solution, the successful SAN requires access software and control software to function properly and fulfill its promise. SAN access software enables the application to use and manipulate the data on a SAN. LUN management, zoning, and locking are examples of access software. SAN control software provides storage resource management, data protection, device performance, and capacity monitoring. A great deal of work in the SAN software area remains to be completed. The location of the SAN software framework is one of the great debates today as the location of the "SAN brains" remains unresolved.

The SAN Fabric Changes

Fibre channel was the hot topic in 1997-1998, then SANS dominated industry talk in 1999. The discussion about the SAN brains aside, the recent activity on the future of I/O interfaces has risen to the top. A SAN over IP? IP is easily the dominant data network protocol and the basis of the global Internet. Ethernet is the basis of roughly 90% of all LANs worldwide. What does this mean? Where does Infiniband fit in this picture? These rapidly emerging trends suggest a convergence or unification of the LAN, WAN, and SANs. Infiniband is a new bus architecture essentially planned to replace the NGIO, PCI, and PCI-X protocols most commonly used for server clustering, internal memory, and bus I/O transfers. It is not available today, though it has recently gained considerable support. Availability is a few years away. The goals of Infiniband (over fiber) include much higher reliability, availability, and scalability increasing crossconnected bandwidth and scaling faster than microprocessors are scaling. Infiniband will conceivably grow from a server interconnect technology and scale to the point where server architecture meets the switched fabric. The switched fabric looks more like an IP-based SAN every passing day. TCP is also the preferred protocol for most new applications. The simplest way to scale an enterprise backbone is to scale Ethernet. The xGigE progression is gaining steam as it leverages the huge installed base of Ethernet. Ethernet first appeared in 1982 with a rated speed of 10Mbps. We will see 10Gbps in the late 2000-2001 timeframe. Discussions about OC-768 are underway. The momentum for xGigE and now Infiniband appear to be squeezing Fibre Channel from both ends. The debate around whether Fibre Channel over IP (the FC tunnel) will become the longterm SAN protocol will heat up as the year goes forward.

Storage Outsourcing Arrives

New service providers appeared in force in 1999. ISPs (Internet Service Providers), ASPs (Application Service Providers), and most recently the SSP (Storage Service Provider) are all forms of what has been called outsourcing. The SSP model treats storage (this means outsourcing your data) as a service based on the reality that the personnel pool of trained storage expertise is not growing and, therefore, storage is not or will not be a core competency for many businesses. Most companies rarely realize the impact IT talent shortages have on their IT function. Insufficient resources, as well as, (obviously) rapidly changing technologies make storage difficult to understand and manage. How many companies have a true storage talent pool? Why not consider outsourcing storage and have it backed by Service Level Agreements?

Eliminating storage from an organization can often allow more focus on the core competencies. The SSP energy comes from accelerating storage growth as annual growth estimates range from 60-100% with only guesses for the dot-com growth factor. The cost per megabyte of storage falls between 30%

and 40% annually. The cost of managing disk storage today can be as much as ten times greater than disk hardware costs. The expenses associated with backup/recovery software, SRM (Storage Resource Management) software, tuning tools, and potentially more hardware add up quickly. Finally, the SAN model works particularly well for the SSP. The concept of a metroSAN using a very wide bandwidth fiber backbone enables both lowlatency data (online applications) and high-latency data (backup/archive) to be outsourced. Long distance optical fiber can extend the SAN beyond the walls of the business and offer lower management expenses due to consolidation and the associated economies of scale. No longer a future discussion, storage outsourcing has arrived.

Converging To Zero

The dynamic changing storage industry is actually part of a much bigger overall moving picture. In the next five years, we will see the "zero convergence factor" change the dimensions and the landscape again and again. We know that storage prices per unit are basically headed toward zero in the next few years. We also observe that CPU prices are headed to zero in a slightly longer timeframe. Global bandwidth, now increasing at a rate of 10x per year, is beginning a pricing slope that will have the price of broadband near zero per unit in a still slightly longer timeframe. Where will the IT focus be in five years when storage, compute power, and bandwidth all get to essentially zero cost? Where will the value be? Change is inevitable. Expect lots of it.

THIS IS THE FULL-TEXT. Copyright West World Publications, Inc. Apr 2000
GEOGRAPHIC NAMES: United States; US

DESCRIPTORS: Storage area networks; Technological change; Convergence
CLASSIFICATION CODES: 5240 (CN=Software & systems); 9190 (CN=United States)
PRINT MEDIA ID: 15538

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Set	Items	Description
S1	2680309	STORAGE()AREA()NETWORK? ? OR SAN OR SANS
S2	59049	(FIBRE OR FIBER)()CHANNEL
S3	8160	INFINIBAND OR INFINI()BAND
S4	133597	PCI OR PERIPHERAL()COMPONENT() (INTERCONNECT? OR INTER()CON- NECT?)
S5	896094	LAN OR LANS OR LOCAL()AREA()NETWORK? ? OR ETHERNET
S6	149346	S2:S5(10N) (COST? ? OR PRICE? ? OR PRICING? ? OR PROPERT??? OR PARAMETER? ? OR ATTRIBUTE? ? OR SPECIFICATION? ? OR CHARAC- TERISTIC? ? OR ASPECTS OR DIFFERENCE? ? OR DIFFERENT OR SIMIL- AR?)
S7	42353	S2:S5(10N) (ADVANTAGE? ? OR BENEFIT? ? OR DISADVANTAGE? ? OR DRAWBACK? ? OR SHORTCOMING? ? OR LIMITED OR LIMITATION? ?)
S8	9979	S1 AND S7
S9	4378	S1(S)S7 OR S1(100N)S7
S10	66014	STORAGE()AREA()NETWORK? ? OR SANS
S11	3439	S10 AND S7
S12	1234	S10(S)S7
S13	19295	S3:S5(5N) (ADVANTAGE? ? OR BENEFIT? ? OR DISADVANTAGE? ? OR DRAWBACK? ? OR SHORTCOMING? ? OR LIMITATION? ?)
S14	185	S10(50N)S13
S15	83	RD (unique items)
S16	22	S15 NOT PD>20000630
S17	2173	S2(5N) (ADVANTAGE? ? OR BENEFIT? ?)
S18	405	S10(25N)S17
S19	171	RD (unique items)
S20	97	S19 NOT (PD>20000630 OR S16)
S21	57	S20(S) (STORAGE()AREA()NETWORK? ?)
S22	40	S20 NOT S21
S23	1091	S3(S)S10
S24	237	S23 NOT PY=2001:2003
S25	82	RD (unique items)
S26	37	S25 NOT PD=20000630:20001231
S27	1347	S4(30N)S10

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02278299 SUPPLIER NUMBER: 54116739
Building a SAN. (Storage Area Networks) (Technology Tutorial)
Levine, Ron; Gervais, Michelle
SunExpert, 10, 3, 50(8)
March, 1999
ISSN: 1053-9239 LANGUAGE: English RECORD TYPE: Abstract

ABSTRACT: The **storage area network** (SAN), an emerging architecture, offers network administrators efficient, innovative solutions for information management. Performance and storage **benefits** are provided in comparison with **LAN** -based network-attached arrangements or with server-to-dedicated-storage direct-attached storage. Typical SAN advantages include improvements in reliability, manageability and data availability. Benefits...

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02237944 SUPPLIER NUMBER: 53200122 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Storage: 3Com Enters Storage Area Networking Market; First Major Networking Company in SANs Unveils Comprehensive Strategy for Market Leadership. (Company Business and Marketing)
EDGE: Work-Group Computing Report, NA
Nov 9, 1998
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1098 LINE COUNT: 00103

... management of both LAN and SAN infrastructures and lowering administrative costs.

3. LAN/WAN/SAN Integration - Phase three scales SAN connectivity to 3Com WAN and **LAN** backbones, extending the **benefits** of **Storage Area Networks** across campus distances and to remote sites for applications such as disaster recovery.

4. Advanced SAN Services - Phase four brings policy-based networking to storage systems in order to provide for services such as security, traffic management and fault management in **SANs**. This phase will also allow offloading the server from disk-intensive traffic using intelligent SAN services.

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02207526 SUPPLIER NUMBER: 20973943 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Breaking the storage bottleneck. (Company Operations)
Hotch, Ripley
Communications News, v35, n7, p12(3)
July, 1998
ISSN: 0010-3632 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1912 LINE COUNT: 00155

... quick to see the importance of storage area networks and network attached storage devices to both his company and to the storage management marketplace. A **storage area network** (SAN) is usually (though not necessarily) based on Fibre Channel rather than Ethernet, with storage devices (like disk arrays and tape libraries) instead of workstations. Servers would be part of the SAN, just as they would the **LAN**.

There are two immediate **benefits** to a SAN. The first is performance: Fibre Channel can run at 100 Mbps full duplex vs. the 20-40

Mbps that is common with...

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02488384 Supplier Number: 61878420 (USE FORMAT 7 FOR FULLTEXT)
**Adaptec Announces EtherStorage Technology; Storage Over Ethernet to be
Demonstrated At Networld+Interop May 9-11, Adaptec Booth No. 533.**
Business Wire, p0152
May 4, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 740

... their diverse needs.
EtherStorage Leverages Ethernet Infrastructure
Because EtherStorage runs over Ethernet and IP, it retains all the
existing networking, interoperability, manageability, compatibility, and
cost **advantages** that have made **Ethernet** so successful. Customers will
now be able to use inexpensive, readily available Ethernet switches, hubs,
and cables to implement low cost, low risk, EtherStorage based **SANs**. In
addition, EtherStorage will leverage future advances in Ethernet
performance and features.
EtherStorage Provides Storage Levels of Performance
Today's storage applications require performance well...

16/3,K/5 (Item 2 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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01814262 Supplier Number: 53938594 (USE FORMAT 7 FOR FULLTEXT)
**Crossroads Systems Teams With Dell to Develop Storage Consolidation Product
for NT Market.**
Business Wire, p0228
Feb 23, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 530

... bottlenecks that plague enterprise network backup operations and
allows remote serviceability and management.
"The unique interoperability feature of Crossroads' routers coupled
with Dell's PowerVault **SANs** will offer customers the ability to integrate
existing SCSI devices into Fibre Channel SAN and **benefit** from **LAN**-free
Backup," said Brian R. Smith, CEO of Crossroads Systems. "The PowerVault
SAN solution will allow organizations to add storage and performance
incrementally while controlling...

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01790909 Supplier Number: 53587633 (USE FORMAT 7 FOR FULLTEXT)
**Box Hill Joins Forces With Legato Systems and StorageTek to Provide
LAN-less Backups Over Storage Area Networks.**
PR Newswire, p6373
Jan 19, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1226

... storage," said Jeff Hodgins, Vice President, Global Distribution,
StorageTek Multiplatform Business Group.
LAN-less Backups

LAN-less Backups are facilitated by the connectivity provided by **SANs**. By allowing disk subsystems and tape libraries to be shared among multiple (UNIX or NT) servers, **SANs** enable information to be protected without affecting the **LAN** or overall system performance. The **benefits** of **LAN** -less Backups include:

Increased Availability

By offloading the LAN from backup traffic, system bandwidth is freed for production operations. In addition, the need for a...

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01710901 Supplier Number: 53017064 (USE FORMAT 7 FOR FULLTEXT)
Crossroads Router Provides Key to Breaking Network Bottlenecks.
PR Newswire, p5994
Sept 21, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 679

... of Fibre Channel Networks. With bi-directional connectivity and support for up to 30 SCSI targets, it allows companies to deploy departmental or enterprise-level **Storage Area Networks** and realize significant performance improvements with a relatively small investment."

Key User Benefits

Companies that are migrating from parallel SCSI to **Storage Area Networks** can use the Crossroads 4200 to realize significant **benefits**. **LAN** -free backup with the Crossroads 4200 eases bottlenecks by eliminating data-network congestion and data-access contention inherent in LAN-based backup (see attached diagrams...

16/3,K/8 (Item 1 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
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04635293 Supplier Number: 61592649 (USE FORMAT 7 FOR FULLTEXT)
DTV Answer Book.
Broadcast Engineering, pNA
March, 2000
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 15407

... of SAN operating system software running on all the workstations connected to both, you get the best of both worlds. Plus this new hybrid SAN/ **LAN** provides all the other **benefits** of **SANs** that the Global 2000 are excited about. The bottom line is that today's leading edge computer networking technology can give your business all the...

16/3,K/9 (Item 2 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
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04407327 Supplier Number: 55474775 (USE FORMAT 7 FOR FULLTEXT)
DATA GENERAL: Data General's CLARiiON Storage Division showcasing open SAN solutions at HP World 99.
M2 Presswire, pNA
August 17, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 805

... HP World '99. CLARiiON -- "THE Storage Alternative" -- offers high-performance and scalable full Fibre Channel storage that delivers a

solid foundation for the adoption of **Storage Area Networks (SANs)** in HP computing environments.

At HP World '99, Demonstrations of CLARiiON full Fibre Channel storage solutions will illustrate the capabilities and development of **SANs**, the **advantages** of **LAN** -free backup and the **benefits** of disaster recovery solutions for HP users. Featured at the Data General booth (#1601) will be the following CLARiiON solutions. CLARiiON **SANs** -- A live demonstration of an open CLARiiON SAN will present the capabilities for sharing stored data on a scalable CLARiiON FC5700 full Fibre Channel RAID ...

16/3,K/10 (Item 3 from file: 636)
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04020704 Supplier Number: 53249716 (USE FORMAT 7 FOR FULLTEXT)
3COM ENTERS STORAGE AREA NETWORKING MARKET.
LAN Product News, v10, n12, pNA
Dec, 1998
Language: English Record Type: Fulltext
Document Type: Newsletter; Trade
Word Count: 1053

... management of both LAN and SAN infrastructures and lowering administrative costs.

3. LAN/WAN/SAN Integration - Phase three scales SAN connectivity to 3Com WAN and **LAN** backbones, extending the **benefits** of **Storage Area Networks** across campus distances and to remote sites for applications such as disaster recovery.

4. Advanced SAN Services - Phase four brings policy-based networking to storage systems in order to provide for services such as security, traffic management and fault management in **SANs**. This phase will also allow offloading the server from disk-intensive traffic using intelligent SAN services.

About 3Com

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06935229 Supplier Number: 58559025 (USE FORMAT 7 FOR FULLTEXT)
SAN trap; SAN vendors struggle to stem the tide of modest, trial implementations and land the big-ticket sales.(Industry Trend or Event)
Connor, Deni
Network World, p85
Dec 27, 1999
Language: English Record Type: Fulltext
Document Type: Tabloid; Trade
Word Count: 1409

... brother relationships with traditional system management vendors, such as Computer Associates, to codevelop storage management packages.

The importance of management shouldn 't be downplayed. The **advantages** of **SANs** - **LAN** -free and serverless backup, data vaulting, remote mirroring, dual-active copying, high availability and fault tolerance - make managing a storage network more complex. Managing storage ...

16/3,K/12 (Item 2 from file: 16)
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06549056 Supplier Number: 55391388 (USE FORMAT 7 FOR FULLTEXT)
Storage-Area Networks.(Technology Information)

Walker, Christy
Computerworld, p74(1)
August 9, 1999
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Tabloid; Trade
Word Count: 677

All are examples of how a **storage - area network** (SAN) can improve storage availability and management.

A SAN is a high-speed network or system that allows different kinds of storage devices such as tape libraries and disk arrays to be shared by all users through network servers. **SANs** -- coupled with Fibre Channel technology -- promise performance and administration **benefits** over traditional **LAN**-based storage. Because a SAN acts independently from the LAN, LAN overhead and traffic are reduced, and overall network performance is improved.

Today, in the...

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06284762 Supplier Number: 54432549 (USE FORMAT 7 FOR FULLTEXT)

Black art?

Harrington, Tony
Unix & NT News, pS24(1)
April, 1999
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 2133

... task is to figure out how to deal with proliferating NT servers, it all comes down to the question of how best to optimise storage. **SANs** are attractive, in this context, because they provide a way of both separating storage from the server and from the network. (**SANs** attach to the back of the server cloud as a separate physical network, which carries the additional advantage of moving backup data traffic off the **local area network** .)

Additional complexity

However, the major **drawback** with **SANs** , Gayle argues, is that they focus simply on decoupling storage from the server. "Any sever can be allocated to any storage, with any amount of...

16/3,K/14 (Item 4 from file: 16)
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06278959 Supplier Number: 54413583 (USE FORMAT 7 FOR FULLTEXT)

More Storage, Less Money -- Network-attached storage proves the right solution for many situations. (Ethernet-based network-attached storage devices vs. Fibre Channel-based storage-area networks) (Technology Information)

Garvey, Martin J.
InformationWeek, p134(1)
April 19, 1999
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Tabloid; General Trade
Word Count: 1324

... More likely than not, most companies will ultimately pay to upgrade to Gigabit Ethernet to support all business operations. But companies that want to use **SANs** will have to bear the costs both of upgrading their existing networks to Gigabit Ethernet for all operations, and of adding a Fibre Channel infrastructure.

NAS devices **benefit** from the Gigabit **Ethernet** infrastructure because these networks boost the speed at which data can move across the

network. "Most important to NAS is network bandwidth," says Dave Hitz...

16/3,K/15 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
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11881689 SUPPLIER NUMBER: 60014732 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Store it!
Eugster, Cristopher C.; Hawn, Jeff; Johnsen, Kristin; Torres, Alberto
McKinsey Quarterly, 43
Wntr, 2000
ISSN: 0047-5394 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 3323 LINE COUNT: 00270

... utilization, greater tolerance of system failures, and better server performance. And because a SAN constitutes a parallel network, most storage-related activities never touch the **LAN**--a compelling **advantage** for companies whose **LANs** are overburdened. The only real **drawback** of the SAN technology is its immaturity; important features, such as the ability to share data among servers running on different platforms, are still under development.

Who will rule?

SANS are therefore the likely winner in the battle for the enterprise storage dollar. Leading hardware storage players--including Compaq, Dell, EMC, HP, and IBM--are...

16/3,K/16 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

02062686 59694023
Addressing the data storage dilemma with Internet protocol storage devices
Fok, Simon K; Toigo, Jon W
Computer Technology Review PP: 11-14 Second Quarter 2000
ISSN: 0278-9647 JRNL CODE: CTN
WORD COUNT: 1686

...TEXT: Internet File System (CIFS) shares "magically" appear to end users.

NAS appliances are a strong technology for exactly the same reasons as the current generation **SANS** are weak. NAS appliances take **advantage** of familiar **Ethernet** networking capabilities and may be monitored and maintained using in-band management capabilities such as Simple Network Management Protocol (SNMP) support, provided by Ethernet. Fibre Channel **SANS**, in contrast, lack in-band manageability. This is a sticking point that has been cited by the SNIA as a potential impediment to widespread adoption...

... would need to be allocated to data transfers. This has the potential of reducing the throughput of other applications that must use the network. The **drawbacks** associated with production **LAN**-based data transfers are exactly what **SANS** are designed to address. **SANS** seek to limit the impact of I/O operations on production networks by placing storage resources in a "back-end" network, separate from the production...

16/3,K/17 (Item 2 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

02042786 56384691
What's in a name? Differentiating SAN and NAS
Ferelli, Mark
Computer Technology Review v20n6 PP: 55 Jun 2000
ISSN: 0278-9647 JRNL CODE: CTN

WORD COUNT: 835

...TEXT: over two years of research and development at Adaptec on future storage fabric architectures. It is a major step forward in bringing the benefits of **SANS** to a broader market because EtherStorage leverages the existing Ethernet infrastructure and provides storage levels of performance. It retains all the existing networking, interoperability, manageability, compatibility, and cost **advantages** that have made **Ethernet** so successful because EtherStorage runs over Ethernet and IP.

New Definitions

It has become comfortable to identify the term SAN with FC communications, but this has historically caused problems . . . and the problems are coming to roost. One of the problems is labeling a SAN or a NAS device. Some **SANS** are destined to go over Ethernet lines; NAS already connects over these lines. How does one tell the difference, now? Or is drawing a distinction ...

16/3,K/18 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

02042775 56384637
OSNI puts FC's feet to the fire
Ferelli, Mark
Computer Technology Review v20n6 PP: 1, 28+ Jun 2000
ISSN: 0278-9647 JRNL CODE: CTN
WORD COUNT: 1523

...TEXT: lower cost of management, increased data availability, and higher levels of performance and scalability. It retains all the existing networking, interoperability, manageability, compatibility, and cost **advantages** that have made **Ethernet** so successful because EtherStorage runs over Ethernet and IP. Customers will now be able to use inexpensive, readily available Ethernet switches, hubs, and cables to implement low cost, low risk. EtherStorage-based **SANS**. This is as an alternative to the more expensive FC solutions.

Computer Network Technology (CNT) announced SAN over IP (Storage Area Network over Internet Protocol...

16/3,K/19 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01811142 04-62133
More storage, less money
Garvey, Martin J
Informationweek n730 PP: 134-135 Apr 19, 1999
ISSN: 8750-6874 JRNL CODE: IWK
WORD COUNT: 1337

...TEXT: More likely than not, most companies will ultimately pay to upgrade to Gigabit Ethernet to support all business operations. But companies that want to use **SANS** will have to bear the costs both of upgrading their existing networks to Gigabit Ethernet for all operations, and of adding a Fibre Channel infrastructure.

NAS devices **benefit** from the Gigabit **Ethernet** infrastructure because these networks boost the speed at which data can move across the network. "Most important to NAS is network bandwidth," says Dave Hitz...

16/3,K/20 (Item 1 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext

(c) 2004 CMP Media, LLC. All rts. reserv.

01167024 CMP ACCESSION NUMBER: DAC19980701S0011

IP Over Fibre Channel (Standards Watch)

DATA COMMUNICATIONS, 1998, n 2710, PG14

PUBLICATION DATE: 980701

JOURNAL CODE: DAC LANGUAGE: English

RECORD TYPE: Fulltext

SECTION HEADING: Newsfront

WORD COUNT: 194

TEXT:

... FCA) have formed a working group with the goal of introducing a complete spec before the IETF. The idea is to take advantage of the **benefits** Fibre Channel has over **Ethernet** -lower overhead, greater throughput, and extension over longer distances-to use it in such applications as **SANs** (**storage - area networks**). "This is just the beginning," says Murali Rajagopal, who is senior manager of product engineering at FCA member Gadzoox Networks Inc. (San Jose, Calif.) and...

16/3,K/21 (Item 1 from file: 674)

DIALOG(R)File 674:Computer News Fulltext

(c) 2004 IDG Communications. All rts. reserv.

068240

Water Cooler: Down with Fibre!

Byline: Paul Desmond

Journal: Network World

Publication Date: August 17, 1998

Word Count: 764 Line Count: 66

Text:

...Fibre Channel for SAN applications. They later sent me an e-mail with a laundry list of issues, pointing out why Fibre Channel had an **advantage** over Gigabit **Ethernet** for each one. They said Fibre Channel uses a larger packet size than Gigabit Ethernet, making it more suitable for the large file transfers required in **SANs**. Gigabit Ethernet uses a 1.5K byte packet size, whereas Fibre Channel assures that up to 64,000 2K bit frames can be sequenced together...

16/3,K/22 (Item 1 from file: 610)

DIALOG(R)File 610:Business Wire

(c) 2004 Business Wire. All rts. reserv.

00090490 19990816228B1218 (USE FORMAT 7 FOR FULLTEXT)

Data General's CLARiiON Storage Division Showcasing Open Storage Area Network Solutions At HP World '99

Business Wire

Monday, August 16, 1999 09:20 EDT

JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT

DOCUMENT TYPE: NEWSWIRE

WORD COUNT: 795

At HP World '99, Demonstrations of CLARiiON full Fibre Channel storage solutions will illustrate the capabilities and development of **SANs**, the **advantages** of **LAN** -free backup and the **benefits** of disaster recovery solutions for HP users. Featured at the Data General booth (#1601) will be the following CLARiiON solutions.

-- CLARiiON **SANs** - A live demonstration of an open CLARiiON SAN will present the capabilities for sharing stored data on a scalable CLARiiON FC5700 full Fibre Channel RAID...

21/3,K/1 (Item 1 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02385793 SUPPLIER NUMBER: 60822992 (USE FORMAT 7 OR 9 FOR FULL TEXT)
**SAN Roundup: Removing The Barriers -- In Praise Of Fibre Channel
SANs. (Technical Overview) (Technology Information)**
Anwar, Imran
Computer Reseller News, 41
March 27, 2000
ISSN: 0893-8377 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1311 LINE COUNT: 00111

Addressing the need for a centralized storage management solution across heterogeneous networked resources, **Fibre Channel storage area network (SAN)** architecture **benefits** a typical networked environment. Delivering a dedicated storage environment, Fibre Channel **SANs** use high-speed fiber-optic or copper cabling to interconnect servers, workstations and storage devices.

Designed specifically to remove the barriers of performance in legacy

21/3,K/2 (Item 2 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02342687 SUPPLIER NUMBER: 56479100 (USE FORMAT 7 OR 9 FOR FULL TEXT)
SCSI still kicking in bus battle. (Technology Information)
Lelii, Sonia R.
PC Week, 1
Oct 18, 1999
ISSN: 0740-1604 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 622 LINE COUNT: 00052

... Systems Inc., a storage device maker in Woburn, Mass.

"What people forget is that SCSI's performance keeps doubling every two years," Namery added.

Fibre Channel 's main **advantage** is its ability to extend to 50 kilometers or more, while SCSI is limited to a few hundred meters. Distance is a critical feature for **storage area networks**.

In addition, each Fibre Channel loop can hook up to 126 devices, while each SCSI channel can connect to only 15 devices.

Because of those...

21/3,K/3 (Item 3 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
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02335072 SUPPLIER NUMBER: 55878982 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Storage Gains Flexibility -- Products Offer Improved Management And Easier Data Access. (new storage products and upgrades from Storage Technology, HP and EMC) (Company Business and Marketing)
Colkin, Martin J. Garvey With Eileen
InformationWeek, 30
Sept 27, 1999
ISSN: 8750-6874 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 430 LINE COUNT: 00038

Next week, StorageTek will unveil a tape-library architecture, dubbed Aegis, for **storage area networks**, as well as enhanced tape-library management software. Products conforming to the Aegis architecture can use Fibre Channel drives internally and also provide external **Fibre Channel** connectivity to take full **advantage** of the 100-Mbytes-per-second bandwidth offered by the interconnect technology. The first Aegis product will be the StorageTek L700 tape library, which can...

21/3,K/4 (Item 4 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02296274 SUPPLIER NUMBER: 54610809 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Enterprise Storage Battle Shifts to Storage Management, SANs. (storage area networks) (Technology Information)
Aluise, Susan J.; Cooper, Lane F.
Enterprise Systems Journal, 14, 5, 42(1)
May, 1999
ISSN: 1053-6566 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 2102 LINE COUNT: 00176

... significantly to the capabilities we deliver to our customers."
"The FibreAlliance is demonstrably committed to delivering open solutions to customers' most pressing challenges for deploying **storage area networks**," says Michael Peterson, president of Strategic Research Corporation, a market research firm located in Santa Barbara, Calif. "By agreeing on common methods for managing SANs...

...for products that employ these methods and then promoting standardization of the specification, this innovative initiative is firmly advancing customers' ability to realize the significant **benefits SANs** have to offer."

Although fibre channel is a key technology in the emerging SAN arena, it cannot be viewed as the solution in and of...

...s a SAN?' you'd get back a one-word answer: 'Fiber.' And fiber is an enabling technology, but it has nothing to do with **storage area network** operation, it has to do with connectivity."

IBM, which will support fibre channel, sees the need for an approach that extends beyond fibre channel technology...

21/3,K/5 (Item 5 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02251234 SUPPLIER NUMBER: 53367344 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Storage: Hitachi Data Systems Announces the Industry's Highest Performance Storage for Clustered-Server Environments. (Product Announcement)
EDGE: Work-Group Computing Report, NA
Dec 7, 1998
DOCUMENT TYPE: Product Announcement LANGUAGE: English
RECORD TYPE: Fulltext
WORD COUNT: 707 LINE COUNT: 00062

... family of "SAN-ready" subsystems to reach the marketplace, the Freedom 5800 was designed from the start -- not just adapted -- for use in enterprise-wide **Storage Area Networks (SANs)** incorporating the high-speed **Fibre Channel** interconnection technology.

Customers who take advantage of the SAN-ready Freedom 5800 for their current needs will be able to leverage its benefits even further as they make it a part of their evolving **Storage Area Networks**.

The Freedom 5800, offered in rack-mountable and cabinet models, uses Hitachi's 3.5-inch, 18 Gigabyte (GB) disk drives and can be configured...

21/3,K/6 (Item 6 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02250848 SUPPLIER NUMBER: 53356953 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Getting a taste for fibre channel. (connecting external storage devices via fibre channel) (Technology Information)
Computer Weekly, 52(1)
Nov 19, 1998

ISSN: 0010-4787 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 883 LINE COUNT: 00077

... is an enabling technology for server clusters. Unix currently has it, and Windows 2000 will have fibre channel support

* It is the core technology for **storage area networks**

* It offers lower-cost interconnections for terabyte storage configurations

* Fibre channel interconnections for storage cabinets provide cabling, distance, and connectivity benefits.

Limitations of SCSI

Unlike...

21/3,K/7 (Item 7 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02179678 SUPPLIER NUMBER: 20645365 (USE FORMAT 7 OR 9 FOR FULL TEXT)

New Server: GS Networks Offers High-Speed Backup and Restore from the Mainframe to the Desktop. (General Signal Networks' ESM/9000 Enterprise Storage Manager) (Product Announcement)

EDGE: Work-Group Computing Report, v8, n16, p16(1)

May 18, 1998

DOCUMENT TYPE: Product Announcement LANGUAGE: English

RECORD TYPE: Fulltext

WORD COUNT: 754 LINE COUNT: 00068

... connect UNIX, Windows NT and LAN servers to a System/390 mainframe for improved utilization of IBM and Storage Technology tape libraries. As an added **advantage**, **Fibre Channel** technology can be used to connect compatible servers in a dedicated **Storage Area Network** (SAN) that provides high-speed backup and restore for critical database applications, and for campus-wide disaster tolerant separation of servers, storage and archived files...

21/3,K/8 (Item 8 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02172641 SUPPLIER NUMBER: 20570544 (USE FORMAT 7 OR 9 FOR FULL TEXT)

Systems: CDNA to speed shared data access. (DataDirect Networks' Concurrent Data Networking Architecture.) (Product Announcement) (Brief Article)

Follmann, Christina

MacWEEK, v12, n17, p21(2)

May 4, 1998

DOCUMENT TYPE: Product Announcement Brief Article ISSN: 0892-8118

LANGUAGE: English RECORD TYPE: Fulltext

WORD COUNT: 355 LINE COUNT: 00032

... applications such as digital video editing and prepress production. It will let users share data across Mac OS, Windows NT and Unix platforms and take **advantage** of high-performance **Fibre Channel** -Arbitrated Loop (FC-AL) cards and storage devices, as well as **Storage Area Network** technologies, DataDirect said.

CDNA will offer data transfer speeds similar to local storage devices. DataDirect said preliminary tests showed Mac speeds currently reach 50 Mbytes...

21/3,K/9 (Item 1 from file: 621)
DIALOG(R)File 621:Gale Group New Prod. Annou. (R)
(c) 2004 The Gale Group. All rts. reserv.

02528534 Supplier Number: 62541373 (USE FORMAT 7 FOR FULLTEXT)

Chaparral Network Storage Signs Distribution Agreement with Transformation Software; Chaparral Expands Presence in the Global SAN Market.

Business Wire, p0029

June 7, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 586

... Transformation Software to offer Chaparral FS1310 and FS1110 Intelligent Storage Routers.

Chaparral routers enable end-users to seamlessly connect SCSI storage devices to Fibre Channel **Storage Area Networks (SANs)**, offering customers the **benefits** of **Fibre Channel** while protecting their investments in new and legacy SCSI devices.

"Chaparral's expertise in storage technology, matched by the affordability and advanced capabilities of its...

21/3,K/10 (Item 2 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02491156 Supplier Number: 61930614 (USE FORMAT 7 FOR FULLTEXT)

JNI Debuts True Multiple OS, Fabric-Enabled SAN Solutions At Networld+Interop.

Business Wire, p1273

May 8, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 966

... demonstrated at the JNI booth, North Hall Booth No. 749, Las Vegas Convention Center.

"JNI is demonstrating the power and applicability of Fibre Channel and **Storage Area Networks**," said Scott Ruple, vice president of marketing, JNI. "These demonstrations exhibit our ability to uniquely deliver on the many important **benefits** of **Fibre Channel**, from heterogeneous **SANs** to speed and Fabric connectivity. Not to mention management tools for our products. This is the first time an HBA company has demonstrated this level...

21/3,K/11 (Item 3 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

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02441364 Supplier Number: 61234962 (USE FORMAT 7 FOR FULLTEXT)

HP Unveils Fibre Channel Support for MO Jukebox Family.

Business Wire, p0362

April 4, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 783

... interconnect technology of choice in enterprise environments, HP, along with its ISV partners, has outlined a point-to-point connectivity solution that lets customers take **advantage** of **Fibre Channel**'s speed and flexibility now, while preparing for the more advanced Fibre Channel-based **Storage Area Networks (SANs)** of the near future.

"The market is ready for a high-speed near-line storage solution from HP," said Mike Peebles, MO product manager with...

21/3,K/12 (Item 4 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

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02419664 Supplier Number: 59621307 (USE FORMAT 7 FOR FULLTEXT)

Overland Makes Simple High-Performance SAN Attachment a Reality.

Business Wire, p0235

Feb 28, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 1084

... nbsp;SAN DIEGO--(BUSINESS WIRE)--Feb. 28, 2000

Overland Data Inc. (Nasdaq:OVRL), a technology leader in tape backup products, today extended its support for **Storage Area Network (SAN)** technology with the introduction of its SANPiper(TM) (a SCSI-to- **Fibre Channel** bridge), bringing the **benefits** of SAN technology to users of Overland's comprehensive line of tape libraries and autoloaders.

Overland's new SANPiper gives the...

21/3,K/13 (Item 5 from file: 621)

DIALOG(R) File 621:Gale Group New Prod.Annou.(R)

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02417239 Supplier Number: 59590435 (USE FORMAT 7 FOR FULLTEXT)

Storage Industry Leaders Endorse Quantum/ATL's Prism Storage Architecture.

Business Wire, p1232

Feb 24, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 1983

... providing tremendous performance and distance benefits over SCSI, the combination of ATL and QLogic addresses what the storage industry is demanding in the area of **Storage Area Network (SAN)** solutions."

Christian Wissman
Chief Operating Officer
Quadrature Software Inc.

"ATL's Prism Storage Architecture is a comprehensive and cost-effective answer to the call...

21/3,K/14 (Item 6 from file: 621)

DIALOG(R) File 621:Gale Group New Prod.Annou.(R)

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02305161 Supplier Number: 59169524 (USE FORMAT 7 FOR FULLTEXT)

Spectra Logic Announces Scalable Backup Solution for Multiple NetApp Filer Environments.

Business Wire, p0317

Feb 3, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 1522

... 100 MB/second bandwidth, and a network-like packet-based protocol which allows users to take advantage of switches and hubs to build larger "storage area networks" (SANs), are just a few of the benefits Fibre Channel brings to the table. Fibre Channel is also used to pull traffic off of the LAN, freeing up LAN bandwidth for user of the data...

21/3,K/15 (Item 7 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02204228 Supplier Number: 56530740 (USE FORMAT 7 FOR FULLTEXT)

TapeServer Wins Communications News' 'Editors' Choice' Award for Innovation
At Network + Interop.

PR Newswire, p3085

Oct 19, 1999

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 505

... across multiple SCSI and/or Fibre-Channel hosts and dynamically reallocate devices. TapeServer also enables the attachment of tape devices into a Fibre Channel SAN (**Storage Area Network**) to realize the speed and connectivity **advantages** of working with **Fibre Channel** .

By incorporating the advantages of centralized backup, combined with the proven efficiency and security of tape storage, TapeServer brings a higher level of data backup...

21/3,K/16 (Item 8 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02147428 Supplier Number: 55445733 (USE FORMAT 7 FOR FULLTEXT)

McDATA Announces EB-1200 FabricGate.

PR Newswire, p8750

August 16, 1999

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 643

... or storage devices to a switched fabric environment through existing SCSI adapters.

"The FabricGate bridge lets you reap the benefits of a Fibre Channel-based **storage area network** (SAN) while protecting your investment in SCSI technology," stated Mike Klayko, executive vice president of McDATA sales and marketing. "It lets you consolidate your existing...

21/3,K/17 (Item 9 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

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01869374 Supplier Number: 54589524 (USE FORMAT 7 FOR FULLTEXT)

Sequent Demonstrates World's Highest Availability SAN at GartnerGroup

Storage 99 Conference.

Business Wire, p0717

May 10, 1999

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 891

... SAN demonstration configuration including NUMA-Q systems (CPU, memory, I/O), Brocade switches, EMC storage and Oracle database software.

Sequent is Defining the Place for **Storage Area Networks** in the Industry

Sequent was the first vendor to provide full-speed fibre channel switched fabric fibre channel SANs providing significant performance advantages over arbitrated...

21/3,K/18 (Item 10 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

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01866717 Supplier Number: 54554247 (USE FORMAT 7 FOR FULLTEXT)

Chaparral Announces Fibre Channel to Ultra2 SCSI Storage Router.

Business Wire, p1448

May 5, 1999

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 976

... speed
interconnect and advanced management features for the growing SAN
market
Chaparral Technologies, Inc., a developer and manufacturer of
Intelligent Routers and RAID Controllers for **Storage Area Networks (SANs)**, announced today its new FS1310 **Fibre Channel -to-Ultra2** Router.
Combining the benefits of Fibre Channel and Ultra2 LVD SCSI, this new
generation router is ideal for the mid-range to high...

21/3,K/19 (Item 11 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01850975 Supplier Number: 54413705 (USE FORMAT 7 FOR FULLTEXT)
**ADIC and Seagate Software Announce Certification Of ADIC Scalar 1000 With
Seagate Backup Exec Fibre Channel San Solution.**
Business Wire, p0766
April 19, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1167

... AIT technology and integrated FibreReady(tm) connectivity, the
Scalar 1000 is ideally suited for being utilized as a shared enterprise
storage resource in a centralized **Storage Area Network** with Seagate
Backup Exec Shared Storage Option.
Seagate Backup Exec Shared Storage Option
Seagate Backup Exec Shared Storage Option leverages the benefits of a
Fibre...

21/3,K/20 (Item 12 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01850242 Supplier Number: 54404279 (USE FORMAT 7 FOR FULLTEXT)
**Seagate Software Announces Certification of ADIC Scalar 1000 With Seagate
Backup Exec Fibre Channel SAN Solution.**
PR Newswire, p2924
April 19, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1175

... or AIT technology and integrated FibreReady connectivity, the
Scalar 1000 is ideally suited for being utilized as a shared enterprise
storage resource in a centralized **Storage Area Network** with Seagate
Backup Exec Shared Storage Option.
Seagate Backup Exec Shared Storage Option
Seagate Backup Exec Shared Storage Option leverages the benefits of a
Fibre...

21/3,K/21 (Item 13 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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01764799 Supplier Number: 53274787 (USE FORMAT 7 FOR FULLTEXT)
**Hitachi Data Systems Announces the Industry's Highest Performance Storage
for Clustered-Server Environments.**
Business Wire, p1109
Nov 30, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 842

... family of "SAN-ready" subsystems to reach the marketplace, the Freedom 5800 was designed from the start -- not just adapted -- for use in enterprise-wide **Storage Area Networks (SANs)** incorporating the high-speed **Fibre Channel** interconnection technology.

Customers who take advantage of the SAN-ready Freedom 5800 for their current needs will be able to leverage its benefits even further as they make it a part of their evolving **Storage Area Networks** .

The Freedom 5800, offered in rack-mountable and cabinet models, uses Hitachi's 3.5-inch, 18 Gigabyte (GB) disk drives and can be configured...

21/3,K/22 (Item 14 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

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01757486 Supplier Number: 53222080 (USE FORMAT 7 FOR FULLTEXT)

Emulex LightPulse Fibre Channel Adapters Certified With Seagate Backup Exec From Seagate Software.

Business Wire, p0455

Nov 16, 1998

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 978

... Seagate Backup Exec Shared Storage Option for both Microsoft Windows NT and Novell NetWare (announced Oct. 26, 1998) marks Seagate Software's entry into the **Storage Area Network (SAN)** market.

Breaking new ground in manageability and performance for large-scale, high-end storage environments, the Seagate Backup Exec Shared Storage Option leverages the...

21/3,K/23 (Item 15 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

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01682755 Supplier Number: 50200598 (USE FORMAT 7 FOR FULLTEXT)

Intelliguard Software Announces Serverless Backup Technology to the Federal Marketplace

PR Newswire, p0727MNM032

July 27, 1998

Language: English Record Type: Fulltext

Article Type: Article

Document Type: Newswire; Trade

Word Count: 617

... some of the world's largest and most complex computing environments. These systems are prime candidates to take advantage of the performance and efficiency of **Storage Area Networks (SANs)**. Celestra is perfectly aligned to support both the inherent **benefits** of **fibre channel** and **SANs** ."

This demonstration marks the industry's firstlive, backup solution over fibre channel with performance speeds ranging up to one terabyte per hour. "Celestra offloads the...

21/3,K/24 (Item 16 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

01677405 Supplier Number: 50168492 (USE FORMAT 7 FOR FULLTEXT)

Industry Endorses Storage With PCI Expansion; Over 20 Storage Industry Vendors Have Signed Agreements to Support ATL's Prism Library Architecture.

Business Wire, p07151148

July 15, 1998

Language: English Record Type: Fulltext

Article Type: Article

Document Type: Newswire; Trade
Word Count: 2202

... providing tremendous performance and distance benefits over SCSI, the combination of ATL and QLogic addresses what the storage industry is demanding in the area of **Storage Area Network (SAN)** solutions."

John Ticer
President and CEO
Stac

"We are pleased to collaborate with ATL, whose Prism architecture demonstrates their leading role in the storage..."

21/3,K/25 (Item 17 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01652518 Supplier Number: 48480970 (USE FORMAT 7 FOR FULLTEXT)
GS Networks Offers High-Speed Backup and Restore from the Mainframe to the Desktop.

Business Wire, p5131265
May 13, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 769

... connect UNIX, Windows NT and LAN servers to a System/390 mainframe for improved utilization of IBM and Storage Technology tape libraries. As an added **advantage**, **Fibre Channel** technology can be used to connect compatible servers in a dedicated **Storage Area Network (SAN)** that provides high-speed backup and restore for critical database applications, and for campus-wide disaster tolerant separation of servers, storage and archived files...

21/3,K/26 (Item 18 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01648067 Supplier Number: 48467474 (USE FORMAT 7 FOR FULLTEXT)
StorageTek Announces Strategic Agreement With Crossroads to OEM Fibre Channel Bridge; StorageTek First to Bring High-Speed SCSI-based Tape Libraries into Fibre-Channel Storage Networks.

Business Wire, p5051233
May 5, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 653

The StorageNet(TM) Fibre Channel/SCSI Bridge 3100, is a key component for building high-speed, cost-effective **storage area networks (SANs)**.

With the Fibre Channel/SCSI Bridge 3100, StorageTek answers the needs of today's enterprise storage customers who want to cost-effectively deploy and derive...

21/3,K/27 (Item 19 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01644159 Supplier Number: 48452207 (USE FORMAT 7 FOR FULLTEXT)
Chaparral Technologies, Inc. Introduces Industry-Leading Family of Fibre Channel Intelligent Storage Bridges.
Business Wire, p04290125

April 29, 1998

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 844

... the Fibre Channel benefit of distance, speed and reliability, especially for enterprise backup applications and the need to access shared data in the rapidly emerging **Storage Area Networks (SAN)**."

Availability A live demonstration of the Enabler(tm) family of Intelligent Storage Bridges can be seen at Networld-Interop, May 5-7, at the...

21/3,K/28 (Item 20 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

01578233 Supplier Number: 48039838 (USE FORMAT 7 FOR FULLTEXT)

ADIC Announces Industry's First Fibre-Channel Tape Library.

Business Wire, pl0091097

Oct 9, 1997

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 687

... the industry's first Fibre-Channel automated tape library, the Scalar 218FC.

The new DLT-based tape library can be connected directly to Fibre-based **Storage Area Networks (SANs)** to provide users with all the **benefits** of **Fibre - Channel** technology, including high bandwidth, gigabit-per-second link speed, flexible connectivity and long-distance data transfer.

"We developed the industry's first Fibre-ready tape...

21/3,K/29 (Item 21 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

01498666 Supplier Number: 47182150 (USE FORMAT 7 FOR FULLTEXT)

Fibre Channel Leaders Partner to Bundle Gigabit-Speed Fibre Channel

"Starter Kit;" "Best of Breed" Solution Provides Fast, Easy Deployment of

Gigabit Speed Server-Storage Networking.

Business Wire, p03040125

March 4, 1997

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 984

... an infrastructure for advanced storage management, long-term scalability and migration to server clustering applications. Additionally, the manageability and open standard nature of Fibre Channel **Storage Area Networks** add up to lower total cost of ownership.

"The benefits of Fibre Channel-Arbitrated Loop technology go far beyond that of a bandwidth and scalability...

21/3,K/30 (Item 1 from file: 636)

DIALOG(R)File 636:Gale Group Newsletter DB(TM)

(c) 2004 The Gale Group. All rts. reserv.

04542970 Supplier Number: 59020321 (USE FORMAT 7 FOR FULLTEXT)

Compaq trials first fibre channel disaster tolerant SAN (storage area network) services.

M2 Presswire, pNA

Jan 26, 2000

Language: English Record Type: Fulltext

Document Type: Magazine/Journal; Trade

Word Count: 799

... Solutions (BCS) group has linked up with Compaq StorageWorks and BT to run the first UK trial of a range of fibre channel disaster tolerant **storage area network** (SAN) services. The trial service will enable companies to combine the protection of Compaq's disaster tolerant SAN services with the high performance **benefits** of **fibre channel** technology, offering unprecedented data throughput, scalability, availability, and data integrity.

Compaq's disaster tolerant SAN services will initially be targeted at London, with sites located...

21/3,K/31 (Item 2 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

04170461 Supplier Number: 54619457 (USE FORMAT 7 FOR FULLTEXT)
SEQUENT COMPUTER SYSTEMS: Sequent demos highest availability SAN
GartnerGroup Storage 99 conference.
M2 Presswire, pNA
May 12, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 912

... SAN demonstration configuration including NUMA-Q systems (CPU, memory, I/O), Brocade switches, EMC storage and Oracle database software.
Sequent is Defining the Place for **Storage Area Networks** in the Industry
Sequent was the first vendor to provide full-speed fibre channel switched fabric fibre channel SANs providing significant performance advantages over arbitrated...

21/3,K/32 (Item 3 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

04022645 Supplier Number: 53264699 (USE FORMAT 7 FOR FULLTEXT)
LEGATO SYSTEMS: Legato Systems announces immediate support for storage networks.
M2 Presswire, pNA
Nov 24, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 956

... a central Legato NetWorker server. This results in the ability to off-load backup traffic from the local area network and move it to the **storage area network**, taking **advantage** of the bandwidth offered by **fibre channel**. Also, the immediate save and restore technology of Legato NetWorker Power Edition enables customers to take maximum **advantage** of **fibre channel** performance capabilities.
Customers will also benefit from an increased return on investment through the sharing of tape resources. The any-to-any. connectivity of SANs
...

21/3,K/33 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

06453438 Supplier Number: 55067375 (USE FORMAT 7 FOR FULLTEXT)
Exploring All Channels.
ALONSO, MARIE RANOIA
Printing Impressions, v42, n1, p58
June, 1999

Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 2398

... to the computers and peripheral devices that require fast access to the data.

Fibre Channel Fact

Fibre channel is the transport protocol of choice for **Storage Area Networks (SANs)**. Fibre channel has won the endorsement of every major server and storage vendor. **Fibre channel** technology offers many substantial **benefits** over current Ultra2 SCSI.

The Gigabit Avenue

While fibre channel may be the prime networking technology for RAID storage, gigabit ethernet--a networking technology that...

21/3,K/34 (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

06301137 Supplier Number: 54498316 (USE FORMAT 7 FOR FULLTEXT)
Trade group touts SCSI rates. (SCSI Trade Association) (Technology Information)

Kovar, Joseph F.
Computer Reseller News, p107(1)
April 19, 1999
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 636

... still in the marketplace," he said.
The growth of Fibre Channel as an interface should not hinder that of SCSI, Allan said. RAID controllers on **Fibre Channel storage area networks** still take **advantage** of SCSI to mask individual disk drive characteristics. "Unless you want to talk to every disk directly, there's no reason not to use SCSI..."

21/3,K/35 (Item 3 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

05755888 Supplier Number: 50240402 (USE FORMAT 7 FOR FULLTEXT)
INTELLIGUARD TARGETS FEDS WITH NEW SERVERLESS BACKUP TECHNOLOGY
Federal Computer Market Report, v22, n15, p3
August 10, 1998
Language: English Record Type: Fulltext
Article Type: Article
Document Type: Magazine/Journal; Trade
Word Count: 229

... some of the world's largest and most complex computing environments. These systems are prime candidates to take advantage of the performance and efficiency of **Storage Area Networks (SANs)**. Celestra is perfectly aligned to support both the inherent **benefits** of **fibre channel** and **SANs**."

O'Gorman says the demonstration marked the industry's first live, backup solution over fibre channel with performance speeds ranging up to one terabyte per...

21/3,K/36 (Item 4 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

05378416 Supplier Number: 48178570 (USE FORMAT 7 FOR FULLTEXT)
Search for black gold
Ouellette, Tim

Computerworld, p061
Dec 15, 1997
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Tabloid; Trade
Word Count: 500

... the incremental difference with this," Tan said.
Amoco's strategy follows the path analysts expect users to take next year and beyond.

"While the initial **benefits** of **Fibre Channel** are that it is faster than SCSI, most users will really see long-term benefits with the externalization of storage in **storage - area networks**," said Michael Peterson, president of Strategic Research Corp., a storage consultancy in Santa Barbara, Calif.

Still, industry watchers and even vendors said more integration work ...

21/3,K/37 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

13030501 SUPPLIER NUMBER: 66891769 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Overland unveils SANpiper. (Brief Article) (Product Announcement)
Computer Dealer News, 16, 13, 56
June 23, 2000
DOCUMENT TYPE: Brief Article Product Announcement ISSN: 1184-2369
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 115 LINE COUNT: 00013

TEXT:

SAN DIEGO, Calif. -- Overland Data Inc. has introduced the SANpiper, a SCSI-to- **fibre channel** bridge that brings the **benefits** of **storage - area network** (SAN) technology to users of tape libraries and autoloaders.

21/3,K/38 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

02007425 52082492
In praise of fibre channel SANs
Anwar, Imran
Computer Reseller News n887 PP: 41, 44 Mar 27, 2000
ISSN: 0893-8377 JRNL CODE: CRN
WORD COUNT: 1221

ABSTRACT: Addressing the need for a centralized storage management solution across heterogeneous networked resources, **Fibre Channel storage area network** (SAN) architecture **benefits** a typical networked environment. Delivering a dedicated storage environment, Fibre Channel **SANs** use high-speed fiber-optic or copper cabling to interconnect servers, workstations, and storage devices. As Fibre Channel SANs are protocol-independent, support for network...
...TEXT: limited organizations from reaping the fullest returns on their investments.

Addressing the need for a centralized storage management solution across heterogeneous networked resources, Fibre Channel **storage area network** (SAN) architecture **benefits** a typical networked environment. Delivering a dedicated storage environment, Fibre Channel **SANs** use high-speed fiber-optic or copper cabling to interconnect servers, workstations and storage devices.

Designed specifically to remove the barriers of performance in legacy...

21/3,K/39 (Item 2 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01904893 05-55885

Storage gains flexibility

Garvey, Martin J

Informationweek n754 PP: 30 Sep 27, 1999

ISSN: 8750-6874 JRNL CODE: IWK

WORD COUNT: 417

...TEXT: more flexible, and better--managed systems, while improving users' access to critical data.

Next week, StorageTek will unveil a tape-library architecture, dubbed Aegis, for **storage area networks**, as well as enhanced tape-- library management software. Products conforming to the Aegis architecture can use Fibre Channel drives internally and also provide external **Fibre Channel** connectivity to take full **advantage** of the 100Mbytes-per-second bandwidth offered by the interconnect technology. The first Aegis product will be the StorageTek L700 tape library, which can use...

21/3,K/40 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01867846 05-18838

Storage-area networks

Walker, Christy

Computerworld v33n32 PP: 74 Aug 9, 1999

ISSN: 0010-4841 JRNL CODE: COW

WORD COUNT: 942

ABSTRACT: A **storage area network** is a high-speed network or system that allows different kinds of storage devices such as tape libraries and disk arrays to be shared by all users through network servers. **SANs** - coupled with **Fibre Channel** technology - promise performance and administration **benefits** over traditional LAN-based storage. Because a SAN acts independently from the LAN, LAN overhead and traffic are reduced, and overall network performance is improved. ...

21/3,K/41 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01779436 04-30427

Freedom vs. performance

Garvey, Martin J

Computer Reseller News n829 PP: SS2-SS13 Feb 15, 1999

ISSN: 0893-8377 JRNL CODE: CRN

WORD COUNT: 2531

TEXT: Headnote:

Storage area networks show promise, but may not be for everyone

The promise of **storage area networks** has many IT executives salivating-and with good reason. **SANs** eliminate point-to-point connections and let every user in a company access data securely from any server in the organization. The **benefits** of **SANs - Fibre Channel**-based storage infrastructures that create pools of storage and pools of servers-can reach across multiple departments of an organization.

For starters, remote sites can...

21/3,K/42 (Item 5 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01733538 03-84528

Setting the stage for storage area networks

Burgener, Eric

Computer Technology Review Storage Inc. Supplement PP: 20-23 Third
Quarter 1998

ISSN: 0278-9647 JRNL CODE: CTN

WORD COUNT: 1754

...TEXT: more flexible and scalable Fibre Channel environment, provides the same benefits on the back endbetween servers and their storage. This architecture is known as a **Storage Area Network** or SAN.

WHAT IS A STORAGE AREA NETWORK ?

A Storage Area Network is a configuration of computer systems and storage, which incorporates LAN/WAN concepts, such as hub connection, switching, and routing, into...

21/3,K/43 (Item 6 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01683557 03-34547

The next frontier

Gordon, Bruce

Communications News v35n8 PP: 46 Aug 1998

ISSN: 0010-3632 JRNL CODE: CNE

WORD COUNT: 721

ABSTRACT: One of the promises of **storage area networks** (SAN) is connectivity advantages for networks with performance advantages over traditional storage channels. Enterprise storage must be flexible.

Advantages of basic **fibre channel** arbitrated loop over parallel SCSI channels include: 1. higher data throughput, 2. greater scalability, and 3. expanded connectivity options. A key attribute for flexible enterprise...

21/3,K/44 (Item 7 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01643574 02-94563

Fibre channel and storage area networks

Cashman, Brian

Broadcast Engineering v40n5 PP: 90-94 May 1998

ISSN: 0007-1994 JRNL CODE: BRG

WORD COUNT: 2492

...ABSTRACT: computer-based approach. NLE technology has developed from stand-alone stations to today's networked systems with multiple seats (users). New technology offers even more **benefits**. Using **Fibre Channel** to develop **storage area networks**, facility-wide access can be made available to every user on the system. Shared media work groups are now a reality as Fibre Channel technology...

...TEXT: developed from stand-alone stations to today's networked systems with multiple seats (users). New technology offers even more benefits. Using Fibre Channel to develop **storage area networks (SANs)**, facility-wide access can be made available to every user on the system.

Shared media work groups are now a reality as Fibre Channel technology...

21/3,K/45 (Item 8 from file: 15)

DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01627967 02-78956

New I/O system possibilities with Fibre Channel

Massiglia, Paul

Computer Technology Review v18n4 PP: 52-54 Apr 1998

ISSN: 0278-9647 JRNL CODE: CTN

WORD COUNT: 1851

...ABSTRACT: Channel Storage Area Network can solve this problem by providing an independent high-performance path between users and data. The advantages of a Fibre Channel Storage Area Network and its architecture are discussed in detail. ...

21/3,K/46 (Item 1 from file: 647)

DIALOG(R)File 647:CMP Computer Fulltext

(c) 2004 CMP Media, LLC. All rts. reserv.

01212041 CMP ACCESSION NUMBER: CRN20000327S0027

SAN Roundup: Removing The Barriers - In Praise Of Fibre Channel SANs (Technical Overview)

Imran Anwar

COMPUTER RESELLER NEWS, 2000, n 887, PG41

PUBLICATION DATE: 000327

JOURNAL CODE: CRN LANGUAGE: English

RECORD TYPE: Fulltext

SECTION HEADING: CRN Test Center

WORD COUNT: 1215

Addressing the need for a centralized storage management solution across heterogeneous networked resources, Fibre Channel storage area network (SAN) architecture benefits a typical networked environment. Delivering a dedicated storage environment, Fibre Channel SANs use high-speed fiber-optic or copper cabling to interconnect servers, workstations and storage devices.

Designed specifically to remove the barriers of performance in legacy...

21/3,K/47 (Item 2 from file: 647)

DIALOG(R)File 647:CMP Computer Fulltext

(c) 2004 CMP Media, LLC. All rts. reserv.

01201153 CMP ACCESSION NUMBER: IWK19990927S0022

Storage Gains Flexibility - Products Offer Improved Management And Easier Data Access

Martin J. Garvey with Eileen Colkin

INFORMATIONWEEK, 1999, n 754, PG30

PUBLICATION DATE: 990927

JOURNAL CODE: IWK LANGUAGE: English

RECORD TYPE: Fulltext

SECTION HEADING: Top Of The Week

WORD COUNT: 396

Next week, StorageTek will unveil a tape-library architecture, dubbed Aegis, for storage area networks, as well as enhanced tape-library management software. Products conforming to the Aegis architecture can use Fibre Channel drives internally and also provide external Fibre Channel connectivity to take full advantage of the 100-Mbytes-per-second bandwidth offered by the interconnect technology. The first Aegis product will be the StorageTek L700 tape library, which can...

21/3,K/48 (Item 3 from file: 647)

DIALOG(R)File 647:CMP Computer Fulltext

(c) 2004 CMP Media, LLC. All rts. reserv.

01189735 CMP ACCESSION NUMBER: IWK19990419S0058

More Storage, Less Money - Network-attached storage proves the right solution for many situations

Martin J. Garvey

INFORMATIONWEEK, 1999, n 730, PG134

PUBLICATION DATE: 990419

JOURNAL CODE: IWK LANGUAGE: English

RECORD TYPE: Fulltext

SECTION HEADING: Hardware

WORD COUNT: 1324

... his two Net App products-at less than \$30,000 each-was much cheaper than upgrading his 20 Sun servers, or investing in Sun's **storage area network**.

When Fibre Channel drives became available last year, the big appeal was their ability to deliver data at

21/3,K/49 (Item 4 from file: 647)

DIALOG(R)File 647:CMP Computer Fulltext

(c) 2004 CMP Media, LLC. All rts. reserv.

01189429 CMP ACCESSION NUMBER: CRN19990419S0094

Trade group touts SCSI rates

Joseph F. Kovar

COMPUTER RESELLER NEWS, 1999, n 838, PG107

PUBLICATION DATE: 990419

JOURNAL CODE: CRN LANGUAGE: English

RECORD TYPE: Fulltext

SECTION HEADING: Sourcing

WORD COUNT: 648

... still in the marketplace," he said.

The growth of Fibre Channel as an interface should not hinder that of SCSI, Allan said. RAID controllers on **Fibre Channel storage area networks** still take **advantage** of SCSI to mask individual disk drive characteristics. "Unless you want to talk to every disk directly, there's no reason not to use SCSI...

21/3,K/50 (Item 1 from file: 674)

DIALOG(R)File 674:Computer News Fulltext

(c) 2004 IDG Communications. All rts. reserv.

071880

UNREALIZED POTENTIAL

STORAGE-AREA NETWORKS HOLD GREAT PROMISE, BUT THE LACK OF AUTOMATION SOFTWARE STANDS IN THE WAY OF DEPLOYMENT.

Journal: Network World Page Number: 39

Publication Date: February 01, 1999

Word Count: 1308 Line Count: 121

Text:

... your network, you could become the Maytag repairman of storage management. This isn't an impossible dream - it's all part of the promise of **storage - area networks** (SAN). A SAN is a collection of networked storage devices, such as server hard drives, tape libraries, RAID and CD jukeboxes, which are able to...

... Paramount and Unisys are already reaping the benefits of FC-AL, it will be some time before they'll be able to fully realize the **benefit** of **SANs**. Several limitations of **Fibre Channel** technology are holding back the development of automated **SANs**. Instead of relying on the loop architecture, full Fibre Channel implementations use switches to route

traffic - this requires a major software overhaul. Two years into...

21/3,K/51 (Item 1 from file: 810)
DIALOG(R)File 810:Business Wire
(c) 1999 Business Wire . All rts. reserv.

0972939 BW0232

WA VIXEL: Vixel Joins the Fibre Alliance to Drive World's First Fibre Channel Management Standards; New Vixel SAN InSite Instrumental in Deployment of Standards to Customers

February 02, 1999

Byline: Business Editors, Technology Writers

...Corporation (NYSE:EMC) and other leading information technology vendors to form a new industry alliance to establish and promote standards for managing Fibre Channel-based storage area networks (SANs).

The Fibre Alliance will benefit Fibre Channel-based solutions by developing and deploying an integrated management interface to gain a high-level view of the...

21/3,K/52 (Item 2 from file: 810)
DIALOG(R)File 810:Business Wire
(c) 1999 Business Wire . All rts. reserv.

0894656 BW0009

LEGATO SYSTEMS 4: Legato Systems Announces Immediate Support for Storage Networks

August 17, 1998

Byline: Business Editors/Technology Writers

...a central Legato NetWorker server. This results in the ability to off-load backup traffic from the local area network and move it to the storage area network , taking advantage of the bandwidth offered by fibre channel. Also, the immediate save and restore technology of Legato NetWorker Power Edition enables customers to take maximum advantage...

21/3,K/53 (Item 3 from file: 810)
DIALOG(R)File 810:Business Wire
(c) 1999 Business Wire . All rts. reserv.

0830937 BW0210

DATADIRECT NETWORKS: DataDirect Networks Introduces 1 GB/sec. Breakthrough Data Access Architecture for Image-Intensive Network Computing

April 03, 1998

Byline: Business Editors & High-Tech Writers

...access architecture enables users to concurrently share data across UNIX, Windows NT and Mac OS computing platforms. CDNA has been optimized to take advantage of Fibre Channel Storage Area Networks (SAN), to offer unparalleled performance levels.

CDNA shatters the technological barriers to image-intensive network data access. Optimized for high-speed Storage Area Networks

(SAN), CDNA offers application servers and workstations incredibly fast shared access to digital images stored on SAN-attached devices. Applications access data on the SAN...

21/3,K/54 (Item 4 from file: 810)
DIALOG(R)File 810:Business Wire
(c) 1999 Business Wire . All rts. reserv.

0767232 BW1179

GADZOOX NETWORKS: Gadzoox Networks CTO Alistair Black to Speak at Next Generation Networks '97

November 03, 1997

Byline: Business Editors & High Tech Writers

...technical
officer, will be speaking on a panel at Next Generation Networks '97.
The panel will be discussing the advantages of Fibre Channel for the **storage area network** .
Who: Alistair Black, CT of Gadzoox Networks
What: Next Generation Server Networking Roundtable Discussion
Topic: Next Generation Server Networking
When: Wednesday, November 5, 1997 at...

21/3,K/55 (Item 1 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00247464 20000403094B7689 (USE FORMAT 7 FOR FULLTEXT)
U.S. Bancorp Piper Jaffray Delivers Report on the Fibre Channel, Versus Ethernet Debate; How Many Angels Can Dance On the Head of a Pin?
Business Wire
Monday, April 3, 2000 15:47 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 880

...price and acceptance advantages of Gigabit, we believe Fibre Channel-based storage will show gains in acceptance over the next five years," said Kumar.

"Nonetheless, **storage - area - network** revenue growth has been lowered by the stress of standards wars and the demands on a diminishing IT staff to learn a new protocol/topology...

21/3,K/56 (Item 2 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00103183 19990914257B0126 (USE FORMAT 7 FOR FULLTEXT)
Comments From Industry Leaders About Vixel; Vixel Announces Java Edition of SAN InSite Management Software and Vixel 2100 Zoning Managed Hub
Business Wire
Tuesday, September 14, 1999 08:24 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 780

...a SAN."

"End users need to start gaining experience with Fibre Channel-based storage now. They benefit from a step-by-step path to full **Storage Area Network** (SAN) functionality, said Robert Gray, senior research director, IDC. "Products like Vixel's 2100 Zoning Managed Hub provide important steps in features and scalability over...

21/3,K/57 (Item 3 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00103169 19990914257B0117 (USE FORMAT 7 FOR FULLTEXT)
Vixel Zoning Hub Moves Beyond Traditional Managed Hubs Vixel 2100 Zoning Managed Hub Offers Multiple Loops and Innovative Management Features for SANs
Business Wire
Tuesday, September 14, 1999 08:22 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 971

End users need to start gaining experience with **Fibre Channel** -based storage now. They **benefit** from a step-by-step path to full **Storage Area Network** (SAN) functionality," said Robert Gray, senior research director, International Data Corporation. "Products like Vixel's 2100 Zoning Managed Hub provide important steps in features and...

22/3,K/1 (Item 1 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02403186 SUPPLIER NUMBER: 62276828 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Latest data warehousing products. (News Briefs)
Communications News, 37, 5, 96
May, 2000
ISSN: 0010-3632 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1488 LINE COUNT: 00128

... by relocating backup data traffic off the conventional LAN and onto a dedicated, high-speed storage network. Overland Data Inc. introduces the SANPiper SCSI-to- **Fibre - Channel** bridge, bringing the **benefits** of SAN technology to users of Overland's line of tape libraries and autoloaders. SANPiper gives companies easy access to fibre-based **SANs** and new SAN-based applications, including LAN-free and server-free backup. SANPiper provides up to four SCSI connections and up to six independent Fibre...

22/3,K/2 (Item 2 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
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02252217 SUPPLIER NUMBER: 53389773 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Storage Area Networks. (Technology Information)
Burgener, Eric
UNIX Review's Performance Computing, 17, 1, 31(1)
Jan, 1999
LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 4155 LINE COUNT: 00353

... ILLUSTRATION OMITTED)

A SAN is a separate computer network that connects storage devices to a heterogeneous set of servers on an any-to-any basis. **SANs** can be created using server-to-storage connectivity based on either SCSI or Fibre Channel, although **Fibre Channel** seems to offer some inherent **advantages**. A SAN also can enable direct storage-to-storage interconnectivity.

A SAN provides a direct, high-speed access path between servers and storage resources (including...

...is investment protection may want to purchase SCSI switches to create the SAN infrastructure. This approach lets a customer experience many of the benefits of **SANs** with a minimum of additional expenditure, completely preserving their existing investment in SCSI-based storage. However, SCSI switching does not offer the full **benefits** that **Fibre Channel** can offer in SAN configuration.

For businesses developing storage architectures for long-term future growth, Fibre Channel architecture is a better choice. Fibre Channel obviates...

22/3,K/3 (Item 3 from file: 275)
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02196197 SUPPLIER NUMBER: 20902169 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Storage: StorageTek and Brocade Strike Deal; StorageTek Becomes First Storage Supplier to Ship Fibre Channel Fabric Switch. (Company Business and Marketing)
EDGE: Work-Group Computing Report, v8, n24, pNA(1)
July 13, 1998
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 869 LINE COUNT: 00080

... fast connections are the order of the day," said Joan Wrabetz, vice president and general manager of StorageTek's Network Systems Group.

"Deploying Fibre Channel **SANs** will instantly improve overall performance while preparing companies to take full **advantage** of native **Fibre Channel** devices as they continue to become available. This worldwide contract further advances StorageTek's industry position, providing us with at least a three- to six...

22/3,K/4 (Item 4 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
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02196175 SUPPLIER NUMBER: 20902147 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Storage: StorageTek Unveils Its Vision to Create Well-Managed, Open Networks for Storage. (Storage Technology Corp.) (Product Announcement)
EDGE: Work-Group Computing Report, v8, n24, pNA(1)
July 13, 1998
DOCUMENT TYPE: Product Announcement LANGUAGE: English
RECORD TYPE: Fulltext
WORD COUNT: 1457 LINE COUNT: 00128

... partnerships to deliver truly seamless information sharing, regardless of storage device or server platform.

Today, the StorageNet products offer customers basic connectivity for building dedicated **SANs**. The breadth of StorageTek's **Fibre Channel** products deliver the **benefits** of increased distance while removing device addressing and performance barriers for storage networking. With the new StorageNet Fibre Channel Switch 4000 and forthcoming Access Hub...

22/3,K/5 (Item 5 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
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02124188 SUPPLIER NUMBER: 20037981 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Fibre Channel brings SAN-ity to storage. (Storage Area Networks) (PC Week Netweek) (Technology Information) (Brief Article)
Chowdhry, Pankaj
PC Week, v14, n50, p122(1)
Dec 1, 1997
DOCUMENT TYPE: Brief Article ISSN: 0740-1604 LANGUAGE: English
RECORD TYPE: Fulltext
WORD COUNT: 455 LINE COUNT: 00039

... completed in 1995, but no vendor is yet shipping them in volume. Until the disks become more available, RAID systems with SCSI disks and a **Fibre Channel** connection present several **advantages**.

By using SCSI disks within the array, vendors can ship products now, even without the Fibre Channel disks. **SANs** enable vendors to tap the extended distances that Fibre Channel allows between the RAID system and its host--up to 2 kilometers over multimode fiber...

22/3,K/6 (Item 1 from file: 621)
DIALOG(R)File 621:Gale Group New Prod. Annou. (R)
(c) 2004 The Gale Group. All rts. reserv.

02544418 Supplier Number: 62831196 (USE FORMAT 7 FOR FULLTEXT)
Computer Associates Certifies Chaparral Routers For Server-Free Backup.
PR Newswire, p3276
June 20, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 482

... tape without host-server intervention.

Chaparral's FS1310 is platform independent, allowing companies to seamlessly connect new and legacy SCSI storage devices to Fibre Channel **SANs**. The FS1310 provides the full **advantages** of **Fibre Channel** while

protecting existing SCSI investments.

"The FS1310 router, working in conjunction with ARCserve 2000 to deliver a server-free backup application, positions Chaparral at the...

22/3,K/7 (Item 2 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02500698 Supplier Number: 62077011 (USE FORMAT 7 FOR FULLTEXT)
Chaparral Announces LAN Management Capabilities for SAN Routers; Chaparral Offers Advanced Configuration and Management Options in FS1310 and FS1110 Routers.
Business Wire, p0003
May 15, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 413

... an extensive, intuitive command structure that seamlessly integrates with third-party management applications.

The Chaparral FS1310 and FS1110 provide the reliable connection between SCSI and **Fibre Channel**, delivering the **benefits** of **Fibre Channel** while protecting end-user investments in SCSI devices. The FS1310 is ideal for enterprise-level **SANs** and is shipped standard with the LAN management feature. The FS1110 is designed for mid-range storage systems and is available with the option of...

22/3,K/8 (Item 3 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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02479652 Supplier Number: 61800399 (USE FORMAT 7 FOR FULLTEXT)
OTG Software's DiskXtender Certified on HP's New SureStore MO Jukebox Family.
PR Newswire, pNA
April 10, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 489

... with Hewlett-Packard's new SureStore family of magneto-optical (MO) jukeboxes. OTG will demonstrate DiskXtender in a point-to-point SAN configuration that takes

advantage of high-speed **Fibre Channel** connectivity which is part of HP's first offering of broader MO Fibre Channel **SANs**. This demonstration highlights OTG's continuing support for SAN solutions and OTG's role as a key HP independent software provider (ISV).

"As part of...

22/3,K/9 (Item 4 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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02425815 Supplier Number: 60003507 (USE FORMAT 7 FOR FULLTEXT)
QLogic's Skip Jones Named President of Fibre Channel Industry Association.
Business Wire, p1157
March 7, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 854

... its dedicated single-chip, embedded I/O processor, QLogic delivers low-cost, high-performance products that provide customers with a technology and time-to-market **advantage**. The company's **Fibre Channel** controllers unleash the power of **SANs** and make large data centers

possible by moving data at rates of up to two gigabits per second to hundreds of storage devices across distances...

22/3,K/10 (Item 5 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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02292885 Supplier Number: 58935752 (USE FORMAT 7 FOR FULLTEXT)
**Chaparral Products Certified by Legato; Legato Testing Verifies
High-performance and Interoperability of Chaparral Routers.**
Business Wire, p0142
Jan 25, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 673

... integrity of customer investments," said Bob Morris, vice president of marketing, Chaparral Network Storage, Inc.

Enabling easy attachment of SCSI devices to Fibre Channel SANs , Chaparral Intelligent Storage Routers allow companies to protect their investment in new and legacy storage devices while taking advantage of the benefits of Fibre Channel technology. Legato and Chaparral are committed to advancing SAN technology, overcoming interoperability issues, and ensuring increased product performance and network scalability.

About Chaparral Network Storage...

22/3,K/11 (Item 6 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02284012 Supplier Number: 58618167 (USE FORMAT 7 FOR FULLTEXT)
**Bell Microproducts Announces the Formation of its BellStor Storage
Solutions Division to Supply Storage Systems and Related Connectivity
Solution Products.**
PR Newswire, p3606
Jan 18, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 626

... and configuration engineers. Services include subsystem configuration, connectivity configuration and support, software support, website information dissemination, installation support and training services. "Our customers understand the benefits of Fibre Channel SANs in data intensive environments, but they don't want to build each piece of the infrastructure themselves," Roussey states. "And when they outsource it, they...

22/3,K/12 (Item 7 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02177981 Supplier Number: 55815772 (USE FORMAT 7 FOR FULLTEXT)
**Brocade Certifies New Fabric Integrator Partners, Releases Solutionware
Guides For Storage Consolidation and Business Continuanace.**
PR Newswire, p0613
Sept 22, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1075

... and testing SAN environments that are designed for storage consolidation and business continuance. The Storage Consolidation guide provides a means for storage administrators to take advantage of Fibre Channel fabric-based SANs to reorganize storage in a more flexible,

efficient and fault-tolerant manner. Storage Consolidation documents SAN configurations utilizing server and storage elements from leading providers ...

22/3,K/13 (Item 8 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02158538 Supplier Number: 55590520 (USE FORMAT 7 FOR FULLTEXT)
Mike Casey Joins Solid Data as Vice President of Marketing;Former Gartner Group Analyst Brings Broad Storage Industry Expertise.
Business Wire, p0222
August 30, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 620

... through enhanced tools for performance analysis and resource management.

More specifically, Casey believes that SAN deployment will greatly increase the range of applications that can **benefit** from solid state storage. " **Fibre Channel SANs** will provide broad connectivity, making SSD more powerful as a shared resource - effectively a hot-file cache for the SAN," Casey said. "As well, virtual...

22/3,K/14 (Item 9 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01882395 Supplier Number: 54713754 (USE FORMAT 7 FOR FULLTEXT)
Digi-Data Delivers Configurable Single/Dual Loop Fibre Channel Hub For Storage Area Network Applications.
Business Wire, p1334
May 25, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 781

... Arbitrated Loop with six ports to provide a Storage Area Network for configurations in which multiple host computers access a storage system.

To support larger **SANs** , several Digi-Data A-2316 Fibre Channel Hubs may be cascaded together to take **advantage** of **Fibre Channel** 's support of long cable lengths, support for a large number of devices, and ease of connectivity.

Performance
The Digi-Data A-2316 Fibre Channel...

22/3,K/15 (Item 10 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01785690 Supplier Number: 53541998 (USE FORMAT 7 FOR FULLTEXT)
Exabyte Announces New Fibre Channel-To-SCSI Router Storage Networking Solution FC12 to Include New Browser-based Monitoring Tool.
PR Newswire, p1356
Jan 11, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 573

... Solutions Division. "When you combine this product with the EXAsoft Monitor Software, you have the industry leading solution for attaching and managing SCSI devices on **Fibre Channel SANs** ."

The **advantages** of **Fibre Channel** include the increased

performance of 100MB/sec bandwidth, support for greater distances to facilitate advanced storage management such as remote mirroring and centralized backup, and...

22/3,K/16 (Item 11 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01755925 Supplier Number: 53215718 (USE FORMAT 7 FOR FULLTEXT)
Ancor to Showcase Switched Storage Area Networks and Interoperability with Leading Vendors at COMDEX.
PR Newswire, p2633
Nov 13, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 376

... A CLARiiON JBOD with Fibre Channel public loop disks from IBM and Seagate is also connected to the switch.
"Ancor is helping bring high-performance **SANs** to the mass market by aggressively pricing its entry-level switch while maintaining the exceptional reliability and performance **benefits** of more expensive **Fibre Channel** switches," said Carla Kennedy, vice president of marketing.
"That means features like low latency, gigabit-speed throughput, hard zoning, and multistage scalability. Plus, Ancor has...

22/3,K/17 (Item 12 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01744383 Supplier Number: 53153233 (USE FORMAT 7 FOR FULLTEXT)
3Com, Legato Systems, and MTI Technology Announce Integration Alliance to Provide Pre-Tested, Interoperable Storage Area Network (SAN) Solutions.
PR Newswire, p3923
Nov 2, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1765

... offered by 3Com's Fibre Channel networking hardware. Also, the immediate save and restore technology of Legato NetWorker Power Edition enables customers to take maximum **advantage** of **Fibre Channel** performance capabilities.
Customers will also **benefit** from an increased return on investment through the sharing of tape resources. The any-to-any connectivity of **SANs** enables tape libraries to be connected to multiple servers and Legato SmartMedia manages the sharing of media and devices between them. Legato SmartMedia enables drive...

22/3,K/18 (Item 13 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

01728778 Supplier Number: 53081140 (USE FORMAT 7 FOR FULLTEXT)
ANDATACO and Gadzoox Networks Sign Strategic Sales and Marketing Agreement for Best-of-Breed Storage Area Networking -- SAN -- Solution.
Business Wire, p1181
Oct 14, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 897

... Software (WSM 3.0) enabling clients to configure, monitor and maintain their external storage systems from anywhere on their network.
"Dataquest research(1) indicates that **SANs** will first be deployed

for specific applications and operating systems, that is NT-based environments with an emphasis on workgroups. One initial **benefit** of a **Fibre Channel** hub will allow users to easily configure storage environments that map exactly into application functionality," stated Thomas Lahive, Senior Analyst with Dataquest's Server Storage...

22/3,K/19 (Item 14 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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01673286 Supplier Number: 50147725 (USE FORMAT 7 FOR FULLTEXT)
StorageTek and Brocade Strike Deal; StorageTek Becomes First Storage Supplier to Ship Fibre Channel Fabric Switch.
Business Wire, p07071285
July 7, 1998
Language: English Record Type: Fulltext
Article Type: Article
Document Type: Newswire; Trade
Word Count: 945

... fast connections are the order of the day," said Joan Wrabetz, vice president and general manager of StorageTek's Network Systems Group. "Deploying Fibre Channel **SANs** will instantly improve overall performance while preparing companies to take full **advantage** of native **Fibre Channel** devices as they continue to become available. This worldwide contract further advances StorageTek's industry position, providing us with at least athree- to six...

22/3,K/20 (Item 15 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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01673257 Supplier Number: 50147696 (USE FORMAT 7 FOR FULLTEXT)
StorageTek Unveils Its Vision to Create Well-Managed, Open Networks for Storage.
Business Wire, p07071246
July 7, 1998
Language: English Record Type: Fulltext
Article Type: Article
Document Type: Newswire; Trade
Word Count: 1415

... partnerships to deliver truly seamless information sharing, regardless of storage device or server platform. Today, the StorageNet products offer customers basic connectivity for building dedicated **SANs**. The breadth of StorageTek's **Fibre Channel** products deliver the **benefits** of increased distance while removing device addressing and performance barriers for storage networking. With the new StorageNet Fibre Channel Switch 4000 and forthcoming Access Hub...

22/3,K/21 (Item 16 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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01648302 Supplier Number: 48468696 (USE FORMAT 7 FOR FULLTEXT)
Exabyte Announces Fibre Channel-To-SCSI Router Storage Networking Solution
PR Newswire, p0505LATU020
May 5, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 864

... Fibre Channel media
-- The support of distances up to 10,000 meters
-- An Ethernet port for SNMP management

"The FC11 allows users to start taking **advantage** of the capabilities of **Fibre Channel SANs** today, while protecting their investment in SCSI storage devices," said Mike Koclanes, general manager and vice president of Exabyte's Storage Automation and Solutions Division...

22/3,K/22 (Item 1 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

04091459 Supplier Number: 53867032 (USE FORMAT 7 FOR FULLTEXT)
EXABYTE: Exabyte announces new fibre channel-to-SCSI router storage networking solution.
M2 Presswire, pNA
Feb 11, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 575

... Solutions Division. "When you combine this product with the EXAsoft Monitor Software. you have the industry leading solution for attaching and managing SCSI devices on **Fibre Channel SANs** .

The **advantages** of **Fibre Channel** include the increased performance of 100MB/sec bandwidth, support for greater distances to facilitate advanced storage management such as remote mirroring and centralized backup, and...

22/3,K/23 (Item 2 from file: 636)
DIALOG(R)File 636:Gale Group Newsletter DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

04022651 Supplier Number: 53264705 (USE FORMAT 7 FOR FULLTEXT)
LEGATO SYSTEMS: 3COM/Legato Systems/MTI announce alliance to provide interoperable SAN solutions.
M2 Presswire, pNA
Nov 24, 1998
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1845

... offered by 3Com's Fibre Channel networking hardware. Also, the immediate save and restore technology of Legato NetWorker Power Edition enables customers to take maximum **advantage** of **Fibre Channel** performance capabilities.

Customers will also **benefit** from an increased return on investment through the sharing of tape resources. The any-to-any connectivity of **SANs** enables tape libraries to be connected to multiple servers, and Legato SmartMedia manages the sharing of media and devices between them.

Legato SmartMedia enables drive...

22/3,K/24 (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

06107202 Supplier Number: 53689284 (USE FORMAT 7 FOR FULLTEXT)
Unrealized potential: storage-area networks hold great promise, but the lack of automation software stands in the way of deployment. (Technology Information)
TADJER, RIVKA
Network World, p39(1)
Feb 1, 1999
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 1326

... Paramount and Unisys are already reaping the benefits of FC-AL, it

will be some time before they'll be able to fully realize the **benefit** of **SANs** . Several limitations of **Fibre Channel** technology are holding back the development of automated **SANs** .

Instead of relying on the loop architecture, full Fibre Channel implementations use switches to route traffic - this requires a major software overhaul. Two years into...

22/3,K/25 (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

06004139 Supplier Number: 53394819 (USE FORMAT 7 FOR FULLTEXT)
Network-Attached Storage. (Product Information)
Garvey, Martin J.
InformationWeek, p52(1)
Dec 14, 1998
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Tabloid; General Trade
Word Count: 449

More important was network-attached storage. NAS will eventually **benefit** from the **Fibre Channel** interconnect and coexist with **SANs** , but it's already operating fine over the current infrastructure. NAS took off because it gives customers an alternative to the old data center model ...

22/3,K/26 (Item 3 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

05965259 Supplier Number: 53247118 (USE FORMAT 7 FOR FULLTEXT)
SANs Help Cut Storage Bottlenecks -- Sophisticated Storage Options Find Footing -- SANs Remove Storage Traffic From The LAN To Increase Network Speed. (Storage Area Networks) (Technology Information)
Hulme, George V.
Computer Reseller News, pE31(1)
Nov 16, 1998
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 1535

... Fibre Channel, though some are based on SCSI, the SAN is an architecture wherein the storage I/O subsystem communication occurs on its own network.

Fibre Channel SANs have many **advantages** over SCSI, said several vendors and analysts. Fibre Channel Arbitrated Loop (FC-AL) supports theoretical data transfer speeds of up to 100 Mbytes per second...

22/3,K/27 (Item 4 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2004 The Gale Group. All rts. reserv.

05273191 Supplier Number: 48033372 (USE FORMAT 7 FOR FULLTEXT)
SANs -- the next networks?
Pendery, David
InfoWorld, p33
Oct 6, 1997
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 865

... hardware using Fibre Channel communications protocols and topologies.

Fibre Channel connections and devices, which are significantly faster than their SCSI counterparts are the lifeblood of **SANs** , analysts and

manufacturers said.

Fibre Channel also has the **advantage** of virtual OS and protocol independence, allowing wide latitude in its implementation. Several vendors, including EMC, HP, Sun Microsystems, McData, CNT, Ancor, and Brocade are...

22/3,K/28 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

11102807 SUPPLIER NUMBER: 54822901 (USE FORMAT 7 OR 9 FOR FULL TEXT)
More storage means more management.
Computer Industry Report, 34, 1, 1(1)
April 27, 1999
ISSN: 0889-082X LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 3158 LINE COUNT: 00258

... storage network, such as hubs, switches, host bus adapters, routers, servers, and storage systems because of the rapid transmission speed over distances. The deployment of **fibre channel** technology is extending the **benefits** of **SANs** into open systems environments
(ILLUSTRATION FOR FIGURE 5 OMITTED).

One of the challenges of the SAN scheme is the lack of a commonly accepted method...

22/3,K/29 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01890271 05-41263
6000FC series is a TrueSAN
Anonymous
Computer Technology Review v19n8 PP: 41 Aug 1999
ISSN: 0278-9647 JRNL CODE: CTN
WORD COUNT: 206

...TEXT: disks, delivering bandwidth and performance. Combined with TrueSAN's load-balancing technology, the product delivers 200MB/sec of accessible bandwidth over one large segment. These **advantages** empower enterprises with a **Fibre Channel** architecture upon which to begin building **SANs** that increase network performance and improve data security and accessibility. With FibreUptime, the company's data-center class redundancy technology, it can withstand up to...

22/3,K/30 (Item 2 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01824968 04-75959
The state of SAN: Jonathan Otis, ADIC
Anonymous
Computer Technology Review Storage Inc. Supplement PP: 16 First Quarter 1999
ISSN: 0278-9647 JRNL CODE: CTN
WORD COUNT: 551

...TEXT: of SCSI?

OTIS: In spite of the fact that SCSI is improving and that it will continue to have a critically important role in storage, **SANs** and **Fibre Channel** should be closely linked. The **advantage** of **Fibre Channel** for **SANs** is that it offers unique features-notable among them the ability to share storage devices among multiple servers-that right now only exist with Fibre ...

22/3,K/31 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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01792567 04-43558

Storage area networks

Burgener, Eric

UNIX Review's Performance Computing v17n1 PP: 31-38 Jan 1999

ISSN: 1098-7150 JRNL CODE: URPC

WORD COUNT: 3587

...TEXT: for storage.

A SAN is a separate computer network that connects storage devices to a heterogeneous set of servers on an any-to-any basis. **SANs** can be created using server-to-storage connectivity based on either SCSI or Fibre Channel, although **Fibre Channel** seems to offer some inherent **advantages**. A SAN also can enable direct storage-to-storage interconnectivity.

A SAN provides a direct, highspeed access path between servers and storage resources (including disk drives...

... is investment protection may want to purchase SCSI switches to create the SAN infrastructure. This approach lets a customer experience many of the benefits of **SANs** with a minimum of additional expenditure, completely preserving their existing investment in SCSI-based storage. However, SCSI switching does not offer the full **benefits** that **Fibre Channel** can offer in SAN configuration.

(Illustration Omitted)

Captioned as: Figure

For businesses developing storage architectures for long-term future growth, Fibre Channel architecture is a...

22/3,K/32 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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01744625 03-95615

Most important products of 98

Gallagher, Sean

Informationweek n713 PP: 44-62 Dec 14, 1998

ISSN: 8750-6874 JRNL CODE: IWK

WORD COUNT: 3735

...TEXT: with storage infrastructures will have to tear out the SCSI interconnect that's in place now.

More important was network-attached storage. NAS will eventually **benefit** from the **Fibre Channel** interconnect and coexist with **SANs**, but it's already operating fine over the current infrastructure. NAS took off because it gives customers an alternative to the old data center model...

22/3,K/33 (Item 5 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
(c) 2004 ProQuest Info&Learning. All rts. reserv.

01743709 03-94699

Sophisticated storage options find footing

Hulme, George V

Computer Reseller News n817 PP: S31-S32 Nov 16, 1998

ISSN: 0893-8377 JRNL CODE: CRN

WORD COUNT: 1406

...TEXT: Fibre Channel, though some are based on SCSI, the SAN is an architecture wherein the storage I/O subsystem communication occurs on its own network.

Fibre Channel SANs have many **advantages** over SCSI, said several vendors and analysts. Fibre Channel Arbitrated Loop (FC-AL) supports theoretical data transfer speeds of up to 100 Mbytes per second...

22/3,K/34 (Item 1 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext
(c) 2004 CMP Media, LLC. All rts. reserv.

01181195 CMP ACCESSION NUMBER: IWK19981214S0038

Network-Attached Storage

Martin J. Garvey
INFORMATIONWEEK, 1998, n 713, PG52
PUBLICATION DATE: 981214
JOURNAL CODE: IWK LANGUAGE: English
RECORD TYPE: Fulltext
SECTION HEADING: Trends
WORD COUNT: 447

More important was network-attached storage. NAS will eventually benefit from the **Fibre Channel** interconnect and coexist with **SANs**, but it's already operating fine over the current infrastructure. NAS took off because it gives customers an alternative to the old data center model ...

22/3,K/35 (Item 2 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext
(c) 2004 CMP Media, LLC. All rts. reserv.

01178058 CMP ACCESSION NUMBER: CRN19981116S0011

SANs Help Cut Storage Bottlenecks - Sophisticated Storage Options Find Footing - SANs Remove Storage Traffic From The LAN To Increase Network Speed.

George V. Hulme
COMPUTER RESELLER NEWS, 1998, n 817, PGE31
PUBLICATION DATE: 981116
JOURNAL CODE: CRN LANGUAGE: English
RECORD TYPE: Fulltext
SECTION HEADING: Emerging Markets
WORD COUNT: 1555

... Fibre Channel, though some are based on SCSI, the SAN is an architecture wherein the storage I/O subsystem communication occurs on its own network.

Fibre Channel SANs have many **advantages** over SCSI, said several vendors and analysts. Fibre Channel Arbitrated Loop (FC-AL) supports theoretical data transfer speeds of up to 100 Mbytes per second ...

22/3,K/36 (Item 1 from file: 810)
DIALOG(R)File 810:Business Wire
(c) 1999 Business Wire . All rts. reserv.

0975772 BW1328

MA DATA GENERAL: CLARiiON Widens Fibre Channel Industry Leadership With 'San-Ready' FC5700 Series Disk Array

February 08, 1999

Byline: Business/Technology Editors

...a storage area network.
Full Fibre Channel implementation combined with Navisphere storage management software positions CLARiiON in a technology leadership role in building tomorrow's **SANs** and global network storage architecture."

Masingill added, "CLARiiON arrays are unsurpassed for providing the power and **benefit** of full **Fibre Channel** technology across a wide range of system platforms, from the host connection to the individual internal disk drives. Many of the other storage vendors simply...

22/3,K/37 (Item 2 from file: 810)
DIALOG(R)File 810:Business Wire
(c) 1999 Business Wire . All rts. reserv.

0826467 BW0118

FIBRE CHANNEL ASSOC: The Fibre Channel Association Announces Fibre Channel Application Seminar At NAB

March 25, 1998

Byline: Business Editors and High-Tech Writers

...Video

Networking," by Steve Bilow, Product Marketing Manager
-- MountainGate - "Improving Workflow Using Fibre Channel and Shared Storage," by Brad Kline, Technology Consultant
-- Prisa Networks - "When **SANs** Meet Post," by Marc Friedman, President

In addition, these speakers will be joined by representatives of other FCA member companies that will present the **benefits** of **Fibre Channel** products and services for the film, video, and broadcast market. Other FCA member companies participating in this seminar include Brocade Communications Systems Inc., Crossroads Systems...

22/3,K/38 (Item 1 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00042982 19990511131B0199 (USE FORMAT 7 FOR FULLTEXT)
SAN Hot Spot Partner Quotes
Business Wire
Tuesday, May 11, 1999 09:25 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 1,345

TEXT:

...the SAN Hot Spot. This is the kind of demonstration project that will help the IT community as whole understand the revolutionary flexibility and performance **benefits** that **Fibre Channel SANs** can provide them," said William Britts, executive vice-president sales and marketing, ADIC."

"Ancor is actively partnering with VERITAS to bring effective management to scalable...

22/3,K/39 (Item 2 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00025109 1999095B0370 (USE FORMAT 7 FOR FULLTEXT)
Industry Leaders Join to Drive Open Storage Network Standards
Business Wire

Monday, April 5, 1999 15:04 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 1,429

...for the management of network
area storage networks." Sequent Computer Systems Inc.

"Sequent, as a provider of UNIX/NT mixed-mode environments, recognizes the tremendous **benefits** that heterogeneous **Fibre Channel SANs** offer customers in terms of performance and flexibility for future technology deployment. For an implementation to be successful, the interoperability of all the elements will...

22/3,K/40 (Item 3 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00019415 1999081B0252 (USE FORMAT 7 FOR FULLTEXT)
Bank of America Report Sees Growth in Storage Management Software Market
Business Wire
Monday, March 22, 1999 12:38 EST
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 537

...offering total SAN solutions to minimize conflict and foster adoption. "Focused participants are already selling established products to those early adopters that now require the **benefits SANs** and **Fibre Channel** offer, said Jim Mac Gregor, a managing director of the Bank of America Technology Group

26/3,K/1 (Item 1 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02401839 SUPPLIER NUMBER: 62235235 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Advanced I/O still comes up short.(Technology Information)
Mehta, Deepal
Electronic Engineering Times, 103
May 22, 2000
ISSN: 0192-1541 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1855 LINE COUNT: 00146

... performance through multiline connections, as well as a host of interoperable link bandwidths.

In an **Infiniband** server node, there is an **Infiniband** I/O bridge rather than the PCI I/O bridge. Also known as an **Infiniband** host-channel adapter, the **Infiniband** bridge generates **Infiniband** links, which are then connected to the **Infiniband** network, which may consist of an inter-processor communication (IPC) network, or **storage area network** (SAN) or local-area/wide-area network (LAN/WAN) (Fig. 1). Various I/O subsystems like Ethernet, Fibre Channel, SCSI or even interprocessor communication communicate through the **Infiniband** network switch fabric.

Migrating a PCI-X server I/O design to **Infiniband** involves several...

26/3,K/2 (Item 2 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02401838 SUPPLIER NUMBER: 62235234 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Architectures head off I/O challenges, rise in traffic.(Overview: I/O Bottlenecks)(Technology Information)
Cole, Bernard
Electronic Engineering Times, 99
May 22, 2000
ISSN: 0192-1541 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1569 LINE COUNT: 00127

... transport protocol, it would be fairly simple to extend the system I/O channel for **storage - area networks**. Even Gigabit Ethernet ...new specification, designed to improve I/O through at the cluster level and between clusters: **Infiniband**.

The specifications for the architecture are due to be finalized and made public later this...

...Giganet Inc. (Concord, Mass.). Existing specs such as SCSI and Fibre Channel are proliferating in **storage - area networks**, and **Infiniband** is apt to go through a number of modifications before it is pinned down.
In...

26/3,K/3 (Item 3 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02399999 SUPPLIER NUMBER: 62025110 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Cleaning Out The Files.(Industry Trend or Event)
KARNEY, JAMES
Internet World, 6, 9, 47
May 1, 2000
ISSN: 1097-8291 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 1331 LINE COUNT: 00103

... is to have the actual storage I/O moved off the server and onto an **InfiniBand** bus," notes Rick Luttrall, director of product management at Crossroads Systems. **InfiniBand** technology is an Intel initiative poised to replace PCI as the primary gateway bus for...

...external I/O controllers providing access to all types of remote media, including LANs and **SANs** .

Luttrall envisions InfiniBand offering LAN-free backups and cutting server overhead. "Storage becomes a brick...

26/3,K/4 (Item 4 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)
(c) 2004 The Gale Group. All rts. reserv.

02396705 SUPPLIER NUMBER: 61952225 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Telecom vendors feel competitive squeeze. (Overview: Open Standards) (Industry Trend or Event)
Thryft, Ann R.
Electronic Engineering Times, 87
May 8, 2000
ISSN: 0192-1541 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 932 LINE COUNT: 00078

... in distance, speed, noise and sensitivity, PCI doesn't do this well."

There will be **InfiniBand** interfaces among servers and mass-storage devices, as well as between commercial servers and ruggedized telecom systems that use **CPCI**. These interfaces will also be used in **storage - area networks** , eventually replacing Fibre Channel, said Pavlat.
Meanwhile, Gigabit Ethernet will be used as a high...

26/3,K/5 (Item 1 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02687419 Supplier Number: 66165755 (USE FORMAT 7 FOR FULLTEXT)
Ancor Reports Record Quarterly Revenue on Continued Growth in SAN Shipments.
PR Newswire, pNA
April 25, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1536

... said Hendrickson.
About Ancor Communications
Ancor Communications, Inc. provides high-performance Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, MTI Technology Corporation, INRANGE Technologies, Hitachi Data Systems a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee and the University of New Hampshire Fibre Channel Consortium...

26/3,K/6 (Item 2 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02686895 Supplier Number: 66165075 (USE FORMAT 7 FOR FULLTEXT)
Ancor to Supply Fibre Channel Switches to EMC.
PR Newswire, pNA
April 25, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 641

... About Ancor Communications
Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, MTI Technology Corp., Hitachi Data

Systems, and SAN...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/7 (Item 3 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02546442 Supplier Number: 62859003 (USE FORMAT 7 FOR FULLTEXT)
**QLogic and Ancor Announce Early Termination of H-S-R Waiting Period;
Stockholder Meeting Dates.**
Business Wire, p0388
June 21, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1690

... Communications
Ancor Communications Inc. (Nasdaq: ANCR) provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/8 (Item 4 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02544353 Supplier Number: 62825502 (USE FORMAT 7 FOR FULLTEXT)
Ancor Advances InfiniBand Initiative at Developers' Conference.
PR Newswire, pNA
June 20, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 391

... Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for storage area networks (**SANs**). The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/9 (Item 5 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02542578 Supplier Number: 62813123 (USE FORMAT 7 FOR FULLTEXT)
Ancor Demonstrates Dynamic Storage Allocation in Sun Solution at Network Storage 2000.
PR Newswire, pNA
June 19, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 459

... About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/10 (Item 6 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02542502 Supplier Number: 62795569 (USE FORMAT 7 FOR FULLTEXT)

Ancor Broadens Worldwide Distribution Channel; ACAL to Distribute Ancor's SANbox(TM) Product Line.

PR Newswire, p1945

June 19, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 588

... About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/11 (Item 7 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02537900 Supplier Number: 62725341 (USE FORMAT 7 FOR FULLTEXT)

Ancor to Participate With Sun Microsystems Launch Event, 'Storage for the Net Economy'.

PR Newswire, pNA

June 14, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 563

... About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/12 (Item 8 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02516624 Supplier Number: 62441504 (USE FORMAT 7 FOR FULLTEXT)

**Ancor Gives Industry's First Live Demonstration of 64-Port Fibre Channel
Director at SAN Conference 2000.**

PR Newswire, pNA

May 30, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 537

... About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/13 (Item 9 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02494647 Supplier Number: 61960414 (USE FORMAT 7 FOR FULLTEXT)

Ancor Brings World's Largest Fibre Channel Switch to N+I; Company's

Superior Switch Technology Highlighted in Interoperability

Demonstrations.

PR Newswire, pNA

May 9, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 526

... About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/14 (Item 10 from file: 621)

DIALOG(R)File 621:Gale Group New Prod.Annou.(R)

(c) 2004 The Gale Group. All rts. reserv.

02492135 Supplier Number: 61928868 (USE FORMAT 7 FOR FULLTEXT)

Fibre Channel Switch Developers Respond To Customers' Needs for

Interoperability.

PR Newswire, pNA

May 8, 2000

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 924

... About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., and...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the

advancement...

26/3,K/15 (Item 11 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02490762 Supplier Number: 61927091 (USE FORMAT 7 FOR FULLTEXT)
QLogic to Acquire Ancor Communications.
Business Wire, p0006
May 8, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1601

... Communications
Ancor Communications Inc. (Nasdaq:ANCR) provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/16 (Item 12 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02489110 Supplier Number: 61878215 (USE FORMAT 7 FOR FULLTEXT)
Ancor Communications and Datalink Form Strategic Partnership to Deliver Scalable Storage Area Networks.
PR Newswire, pNA
May 4, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 627

... Meland added.
About Ancor Communications
Ancor Communications Inc. provides high-performance SANbox(TM) switches for **storage area networks (SANs)**. The company was the first to deliver a Fibre Channel switch, and the first to...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/17 (Item 13 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02489009 Supplier Number: 61878109 (USE FORMAT 7 FOR FULLTEXT)
Anacomp(R) and Ancor Communications Sign Worldwide Maintenance Agreement.
PR Newswire, p3529
May 4, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 890

... Communications
Ancor Communications Inc. (Nasdaq: ANCR) provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE

Corporation, MTI Technology Corp., Sun...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/18 (Item 14 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02479839 Supplier Number: 61800610 (USE FORMAT 7 FOR FULLTEXT)
Ancor Serves Up Fibre Channel Storage Networking for Video Editing at National Association of Broadcasters Show.
PR Newswire, pNA
April 10, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 684

... About Ancor Communications
Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, Hitachi Data Systems, and MTI Technology Corp., as...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/19 (Item 15 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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02479766 Supplier Number: 61800528 (USE FORMAT 7 FOR FULLTEXT)
Ancor and Computer Associates Demonstrate Integration Advancement at CA-World 2000; SANbox Switches Managed Along with Other Devices From Single Console.
PR Newswire, p8071
April 10, 2000
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 440

... About Ancor Communications
Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, Hitachi Data Systems, and MTI Technology Corp., as...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/20 (Item 16 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
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02474762 Supplier Number: 61753387 (USE FORMAT 7 FOR FULLTEXT)
Adaptec Reports FY 2000 and Fourth Quarter Results; Fiscal Year Net Income up 136% and EPS up 142% from FY99; Leadership Position for the Future.
Business Wire, p0157
April 27, 2000

Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 2144

... Adaptec will focus on bringing new levels of functionality and interoperability to our customers with **Storage Area Network** initiatives in Fibre channel, Ethernet, and **Infiniband**.

To complement the Storage Networking Solutions Group, the company has combined the Host I/O...

26/3,K/21 (Item 17 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02453724 Supplier Number: 61404172 (USE FORMAT 7 FOR FULLTEXT)
Eurologic Systems and Forefront Graphics To Partner With Ancor To Showcase Applications Running On SANs At NAB 2000.

Business Wire, p1566

April 10, 2000

Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1098

... Communications

Ancor Communications Inc. (Nasdaq:ANCR) provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, Hitachi Data Systems, and MTI, as well as...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/22 (Item 18 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02263883 Supplier Number: 58307964 (USE FORMAT 7 FOR FULLTEXT)
Crossroads Systems Joins InfiniBand Trade Association; Crossroads' Participation Focuses On Open Standards Processes.

Business Wire, p0396

Dec 20, 1999

Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 552

... and communication capacities is critical."

In the evolution of Fibre Channel and Storage Area Networks (**SANs**), Crossroads has played a key role in interoperability, LAN-free backup, storage and server migration solutions. Now, with the development of new System I/O initiatives and participation in the **InfiniBand** Trade Association, Crossroads broadens its focus to provide additional I/O routing solutions to the...

26/3,K/23 (Item 19 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02232108 Supplier Number: 57565108 (USE FORMAT 7 FOR FULLTEXT)
Mylex Ships One Millionth RAID Controller; Pioneer in RAID Technology Celebrates the RAID Controller's Contribution in Network Availability and Performance.

Business Wire, p0498

Nov 15, 1999

Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 1012

... move forward, Mylex will continue to develop leading RAID technologies such as 2 GB Fibre, **Infiniband**, clustering, **Storage Area Networks** and PCI-x."
Mylex began shipping its first RAID controllers in 1992 to a large...

26/3,K/24 (Item 20 from file: 621)
DIALOG(R)File 621:Gale Group New Prod.Annou.(R)
(c) 2004 The Gale Group. All rts. reserv.

02227880 Supplier Number: 57480871 (USE FORMAT 7 FOR FULLTEXT)
Genroco Unveils Next Generation High Performance Storage Area Networks.
Business Wire, p1384
Nov 10, 1999
Language: English Record Type: Fulltext
Document Type: Newswire; Trade
Word Count: 722

... offerings because while it can support FC connected hosts, storage, and switch fabrics like typical **SANs**, it can also operate Gigabit Ethernet, HIPPI, ATM, **Infiniband**, or other communication protocols.
"The SC99 show is an exciting opportunity to demonstrate our progressive...

26/3,K/25 (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2004 The Gale Group. All rts. reserv.

11728872 SUPPLIER NUMBER: 59207174 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Breakthrough Semiconductor Chip from AANetcom Increases the Performance of the Internet.
PR Newswire, 3574
Feb 7, 2000
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 670 LINE COUNT: 00058

... technology is also used in applications such as terabit routers, Gigabit and 10Gigabit Ethernet, FibreChannel, **Infiniband**, **Storage Area Networks** (SAN) and SONET. The company's technology is scalable.
NOTE: OctalPHY is a registered trademark...

26/3,K/26 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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02042787 56384692
Making sense of 2Gbps fibre channel
Anderson, Dave
Computer Technology Review v20n6 PP: 56-58 Jun 2000
ISSN: 0278-9647 JRNL CODE: CTN
WORD COUNT: 1614

...TEXT: much more than a peripheral attachment medium; it is really the basis for the entire **Storage Area Network** industry. (While there is nothing that limits **SANs** to Fibre Channel, the fact remains that virtually nothing else is used today.) Moreover, the...

... at 1GHz has become the basis for all the new high speed serial interfaces, including **InfiniBand**, Gigabit Ethernet, and Serial ATA.

There has been growing interest in seeing Fibre Channel performance...

26/3,K/27 (Item 2 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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02020831 53637729

InfiniBand--a look ahead ✓

Heil, Tom

Computer Technology Review v20n4 PP: 50 Apr 2000

ISSN: 0278-9647 JRNL CODE: CTN

WORD COUNT: 970

...TEXT: Each server node needs local I/O like boot drives to function.)

To replace PCI, **InfiniBand** must, by definition, be a true unified systems area network, not just a **Storage Area Network** like Fibre Channel. Like PCI, a unified network can transport any/all traffic types: LAN/WAN, cluster IPC, and storage. A user may allocate specific **InfiniBand** channels to specific functions, but it's a configuration rather than a technology choice.

The...

26/3,K/28 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)
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02020815 53637624

Storage Networks start to converge. NAS gains momentum and respect

Moore, Fred

Computer Technology Review v20n4 PP: 1, 28+ Apr 2000

ISSN: 0278-9647 JRNL CODE: CTN

WORD COUNT: 1372

...TEXT: unresolved.

The SAN Fabric Changes ✓

Fibre channel was the hot topic in 1997-1998, then **SANS** dominated industry talk in 1999. The discussion about the SAN brains aside, the recent activity...

... the basis of roughly 90% of all LANs worldwide. What does this mean? Where does **Infiniband** fit in this picture? These rapidly emerging trends suggest a convergence or unification of the LAN, WAN, and **SANS**.

Infiniband is a new bus architecture essentially planned to replace the NGIO, PCI, and PCI-X...

...it has recently gained considerable support. Availability is a few years away. The goals of **Infiniband** (over fiber) include much higher reliability, availability, and scalability increasing crossconnected bandwidth and scaling faster than microprocessors are scaling. **Infiniband** will conceivably grow from a server interconnect technology and scale to the point where server...

26/3,K/29 (Item 1 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext
(c) 2004 CMP Media, LLC. All rts. reserv.

01216189 CMP ACCESSION NUMBER: EET20000522S0087

Advanced I/O still comes up short

Deepal Mehta, Business Unit Manager, Computer Servers, William Lau, Senior Manager, CoreWare Development & Applications, Internet Computing Division, LSI Logic, Milpitas, Calif.

ELECTRONIC ENGINEERING TIMES, 2000, n 1114, PG103

PUBLICATION DATE: 000522

JOURNAL CODE: EET LANGUAGE: English

RECORD TYPE: Fulltext

SECTION HEADING: Communications - Focus: Servers, Routers, Switches

WORD COUNT: 1698

... performance through multiline connections, as well as a host of interoperable link bandwidths.

In an **Infiniband** server node, there is an **Infiniband** I/O bridge rather than the PCI I/O bridge. Also known as an **Infiniband** host-channel adapter, the **Infiniband** bridge generates **Infiniband** links, which are then connected to the **Infiniband** network, which may consist of an inter-processor communication (IPC) network, or **storage area network** (SAN) or local-area/wide-area network (LAN/WAN) (Fig. 1). Various I/O subsystems like Ethernet, Fibre Channel, SCSI or even interprocessor communication communicate through the **Infiniband** network switch fabric.

Migrating a PCI-X server I/O design to Infiniband involves several ...

26/3,K/30 (Item 2 from file: 647)
DIALOG(R)File 647:CMP Computer Fulltext
(c) 2004 CMP Media, LLC. All rts. reserv.

01215146 CMP ACCESSION NUMBER: EET20000508S0067
Telecom vendors feel competitive squeeze (Overview: Open Standards)
ANN R. THRYFT
ELECTRONIC ENGINEERING TIMES, 2000, n 1112, PG87
PUBLICATION DATE: 000508
JOURNAL CODE: EET LANGUAGE: English
RECORD TYPE: Fulltext
SECTION HEADING: Embedded Systems - Focus: Single Board Computers
WORD COUNT: 869

... in distance, speed, noise and sensitivity, PCI doesn't do this well."

There will be **InfiniBand** interfaces among servers and mass-storage devices, as well as between commercial servers and ruggedized telecom systems that use CPCI. These interfaces will also be used in **storage - area networks**, eventually replacing Fibre Channel, said Pavlat.

Meanwhile, Gigabit Ethernet will be used as a high...

26/3,K/31 (Item 1 from file: 674)
DIALOG(R)File 674:Computer News Fulltext
(c) 2004 IDG Communications. All rts. reserv.

085291
Storage vendors tackle SAN issues
Byline: DENI CONNOR
Journal: Network World Page Number: 29
Publication Date: June 26, 2000
Word Count: 1110 Line Count: 94

Text:

...Town Meetings concerned the future of Fibre Channel and recommendations on how best to implement **storage - area networks** or network-attached storage. At the meeting were Randy Chalfant of Storagetek, Eric Ottem of...

... Editor Doug Barney fielded the questions. What issues are impeding IT managers' ability to implement **SANs**? BMC: We have a group of 10 corporate users called our SAN Council that perceives that the costs of implementing **SANs** is astronomical because it calls for new technology and they don't know how to...

... justify the SAN that way. How do Fibre Channel and storage over IP play

in **SANs** going forward? Gadzoox: I see an implementation that Fibre Channel-based SAN islands on the...

... be here to stay for quite a while. Gadzoox: Six months ago people said that **InfiniBand** would displace Fibre Channel. Six months from now it might be another technology. Fibre Channel...

... isn't going to get to the destination successfully. Fibre Channel assumes it is. With **SANs** and their dedicated channels, there is no traffic contention like there is in Ethernet. It... the industry numbers? StorageTek: Smith Barney says 35% of all those polled are currently evaluating **SANs**, 30% are implementing them, 8% have put in a SAN and 44% haven't done...

26/3,K/32 (Item 2 from file: 674)
DIALOG(R)File 674:Computer News Fulltext
(c) 2004 IDG Communications. All rts. reserv.

084324

Start-up plots storage over IP coup

Byline: DENI CONNOR

Journal: Network World Page Number: 22

Publication Date: May 22, 2000

Word Count: 493 Line Count: 47

Text:

... or wide-area SONET networks. In a storage-over-IP network, SCSI- or next-generation **Infiniband** -based servers, tape libraries and Fibre Channel, SCSI or ESCON disk arrays can connect and...

... to a Gigabit Ethernet switch or router. Data is transported across Gigabit Ethernet network to **storage - area networks** (SAN) on the other side of the IP-based network or local workstations without the...

... storage-over-IP adapters presents none of the interoperability concerns and unfamiliarity of Fibre Channel **SANs**, the company says. "I love Nishan's chances," says Steve Duplessie, an analyst with the...

... IT managers polled by Enterprise Management Associates in Boulder, Colo., said they would not implement **SANs**. Most said a lack of standards was the chief deterrent. Well-heeled with \$30 million...

... in funding from Cisco, Intel and two other vendors, sources say. Intel invested in other **Infiniband** projects at Crossroads Systems and Ancor Communications. Jayshree Ullal, vice president and general manager of...

26/3,K/33 (Item 3 from file: 674)
DIALOG(R)File 674:Computer News Fulltext
(c) 2004 IDG Communications. All rts. reserv.

082684

Crossroads exec talks up SAN futures

Byline: Deni Connor

Journal: Network World Page Number: 24

Publication Date: April 03, 2000

Word Count: 841 Line Count: 74

Text:

... s why we are complementing our routing story with a WAN, appliance, System/390 and **Infiniband** routing story. **Infiniband** is a specification for next-generation system I/ that uses multiple switched paths to route...

... this new enterprise storage architecture functional once installed. IT managers need to get comfortable with **SANs** and their continuing function. SAN management software will help immensely. With the popularity of the...

... the services they receive from a local data center and an

Internet-accessed data center? **SANs** will be a key enabler for the Internet to continue its rapid growth. As companies...

... my information assets worth? Keeping them protected and accessible via backup is a requirement. With **SANs**, backup can be improved in speed by a factor of 10, and the cost can...

... distributed over a larger population of servers, making it much cheaper to purchase and operate. **SANs** bring more manageable gigabytes per IT staff person and enable organizations to scale with the...

... focus on four additional spaces. The first is the wide-area networking business, which allows **SANs** to be implemented over large geographies with ATM or Gigabit Ethernet. According to market research firm IDC, 40% of **SANs** by 2003 will have a wide-area networking need. The second area we are working...

... they are typically seven days behind the data on the mainframe. Last, we will build **Infiniband** routing. We will route **Infiniband** to the world of storage.

26/3,K/34 (Item 1 from file: 610)
DIALOG(R)File 610:Business Wire
(c) 2004 Business Wire. All rts. reserv.

00273676 20000508129B4213 (USE FORMAT 7 FOR FULLTEXT)
(ANCR) QLogic to Acquire Ancor Communications
Business Wire
Monday, May 8, 2000 03:19 EDT
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 1,645

...Communications

Ancor Communications Inc. (Nasdaq:ANCR) provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include EMC, Hitachi Data Systems, INRANGE Corporation, MTI Technology Corp., Sun...

...is a member of the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the **InfiniBand** Trade Association, the ANSI Standards Committee, and the University of New Hampshire Fibre Channel Consortium...

26/3,K/35 (Item 1 from file: 613)
DIALOG(R)File 613:PR Newswire
(c) 2004 PR Newswire Association Inc. All rts. reserv.

00301863 20000330MNTH008 (USE FORMAT 7 FOR FULLTEXT)
Ancor Adds New OEM Sales Director to Build Eastern Team
PR Newswire
Thursday, March 30, 2000 08:30 EST
JOURNAL CODE: PR LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 398

...About Ancor Communications

Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, Hitachi Data Systems, and MTI Technology Corp., as...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/36 (Item 2 from file: 613)
DIALOG(R)File 613:PR Newswire
(c) 2004 PR Newswire Association Inc. All rts. reserv.

00300812 20000329HSW016 (USE FORMAT 7 FOR FULLTEXT)
Bell Microproducts Signs Agreement to Distribute Ancor's Sanbox(TM) Switches
PR Newswire
Wednesday, March 29, 2000 06:00 EST
JOURNAL CODE: PR LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 509

...About Ancor Communications
Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, Hitachi Data Systems, and MTI Technology Corp., as...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

26/3,K/37 (Item 3 from file: 613)
DIALOG(R)File 613:PR Newswire
(c) 2004 PR Newswire Association Inc. All rts. reserv.

00297577 20000323MNTH011 (USE FORMAT 7 FOR FULLTEXT)
Ancor Ranked Among Top 10 Best-Managed, Fastest-Growing Tech Companies in the World by Forbes ASAP
PR Newswire
Thursday, March 23, 2000 09:47 EST
JOURNAL CODE: PR LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 458

...About Ancor Communications
Ancor Communications Inc. provides high-performance SANbox(TM) Fibre Channel switches for **storage area networks (SANs)**. The company's customers include Sun Microsystems, Hitachi Data Systems, and MTI Technology Corp., as...

...the Fibre Channel Industry Association, the Storage Networking Industry Alliance, the ANSI Standards Committee, the **InfiniBand** Trade Association, and the University of New Hampshire Fibre Channel Consortium to promote the advancement...

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 (c) 2003 EBSCO Pub.
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Set	Items	Description
S1	577846	STORAGE()AREA()NETWORK? ? OR SAN OR SANS
S2	2510	(FIBRE OR FIBER)()CHANNEL
S3	312	INFINIBAND OR INFINI()BAND
S4	16006	PCI OR PERIPHERAL()COMPONENT() (INTERCONNECT? OR INTER()CON- NECT?)
S5	142958	LAN OR LANS OR LOCAL()AREA()NETWORK? ? OR ETHERNET
S6	1571	S2:S5(5N) (ADVANTAGE? ? OR BENEFIT? ? OR DISADVANTAGE? ? OR DRAWBACK? ? OR SHORTCOMING? ? OR LIMITATION? ?)
S7	47	S1 AND S6
S8	42	RD (unique items)
S9	15	S8 NOT PY=2001:2003
S10	251	S1 AND S3:S4
S11	174	S10 NOT PY=2001:2003
S12	13226	S2:S5(10N) (COST? ? OR PRICE? ? OR PRICING? ? OR PROPERT??? OR PARAMETER? ? OR ATTRIBUTE? ? OR SPECIFICATION? ? OR CHARAC- TERISTIC? ? OR ASPECTS OR DIFFERENCE? ? OR DIFFERENT OR SIMIL- AR?)
S13	259	S1 AND S12
S14	31	S3:S4 AND S13
S15	27	RD (unique items)
S16	18	S15 NOT PY=2001:2003
S17	32	S9 OR S16

17/5/4 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

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6461597 INSPEC Abstract Number: B2000-02-7550-006, C2000-02-5620L-040

Title: What to do if your LAN isn't fast enough

Author(s): Chernyshov, D.

Conference Title: IEE European Workshop. Distributed Imaging (Ref. No.1999/109) p.7/1-5

Publisher: IEE, London, UK

Publication Date: 1999 Country of Publication: UK 136 pp.

Material Identity Number: XX-1999-03522

Conference Title: IEE European Workshop. Distributed Imaging

Conference Sponsor: IEE

Conference Date: 18 Nov. 1999 Conference Location: London, UK

Language: English Document Type: Conference Paper (PA)

Treatment: Applications (A); Practical (P)

Abstract: The medical industry is a fine example of the trend of increasing resolution and volume of images being handled by off-the-shelf technology from the computer industry. In the last dozen years multiple non-invasive imaging technologies have come into widespread use in medical facilities around the world-computer aided tomography (CT) scan, magnetic resonance imaging (MRI), digital radiology (DR), and computer radiology (CR). Using either SCSI, or the new SCSI derivative-Fibre Channel-a new kind of network can be built that connects multiple computers directly to storage. Connection devices similar to the ones used on the LAN-routers, hubs, bridges, and switches-allow this **storage area network**, or **SAN**, to scale up in size just as **LANs** can scale up. But the **advantage** of course, is that the **SAN** is much more efficient at moving large quantities of data very quickly. Just as the computers connected to a LAN originally needed a network operating system, or NOS, computers now connected to a **SAN** need a **storage area network** operating system, or **SAN -OS**, to allow multiple computers to all coexist peacefully on the **SAN** with no data corruption. SANergy/sup TM/ from Mercury Computer Systems, Inc. is the world's first **SAN -OS**. (0 Refs)

Subfile: B C

Descriptors: biomedical MRI; computerised tomography; local area networks ; medical image processing; network operating systems; PACS; radiology

Identifiers: LAN; medical industry; off-the-shelf technology; computer industry; multiple noninvasive imaging technologies; medical facilities; computer aided tomography; CT scan; magnetic resonance imaging; MRI; digital radiology; computer radiology; SCSI; Fibre Channel; **storage area network** ; network operating system; SANergy; **SAN -OS**; Mercury Computer Systems; LAN/ **SAN** architecture; PACS

Class Codes: B7550 (Biomedical communication); B7510 (Biomedical measurement and imaging); B6210L (Computer communications); C5620L (Local area networks); C5260B (Computer vision and image processing techniques); C7330 (Biology and medical computing)

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17/5/6 (Item 1 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00610577 00IY09-108

Information overload -- An avalanche of data makes storage companies hot - and highlights two competing technologies

Boslet, Mark

Industry Standard, The , September 11, 2000 , v3 n35 p116-117, 2 Page(s)

ISSN: 1098-9196

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

Discusses two emerging **storage area network (SAN)** technologies: fibre channel-based and Internet Protocol-based (IP). Presents market researcher International Data Corp.'s estimate that the storage market will reach \$46.4 billion in 2003, from \$34.3 billion in 2000. Says that IP

offers significant **benefits** over **fibre** **channel** when paired with high-speed Ethernet networking gear. Names EMC, Compaq Computer, IBM, Sun Microsystems, Hewlett-Packard, and Network Appliance among storage vendors. Explains that the rapid growth of storage is raising the stakes in the struggle between companies deploying fibre channel and those moving to IP **SANs**. Reports that networking equipment giant Cisco Systems Inc. has agreed to buy NuSpeed Internet Systems, a developer of technology to connect **SANs** to each other and to other networks. Includes a photo and a chart. (MEM)

Descriptors: **Storage** **Area** **Networks** ; Information Storage; Internet Protocols; Mass Storage; Client-Server Computing

17/5/7 (Item 2 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00608272 00EI08-004

Summer of SAN

Doering, David

Emedia , August 1, 2000 , v13 n8 p60, 1 Page(s)

ISSN: 1525-4658

Company Name: Adaptec; Microtest; Procom Technology; StoreAge Networking Technologies; Connex

URL: <http://www.adaptec.com> <http://www.microtest.com> <http://www.storeage.com> <http://www.SANavigator.com>

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

NETWORK OBSERVER column cites the exhibition of storage products during the 2000 Network+Interop show in Las Vegas, NV. Describes EtherStorage, a Gigabit Ethernet **storage** **area** **network** (**SAN**) system from Adaptec which uses off-the-shelf Ethernet hardware to create the **SAN**. Enumerates **Fibre** **Channel** 's **advantages** over Gigabit **Ethernet**. Says, however, that Gigabit Ethernet overcomes barriers to **SAN** proliferation, namely high costs of implementation, immaturity of products, and the lack of standards. Presents results from ZDLabs' testing of the Microtest FileZerver network-attached storage (NAS) system. Indicates that Procom exhibited its NetForce 2000 NAS series in several varieties. Reports that StoreAge Networking Technologies' **SAN** Volume Manager utility enables a way to create multiple virtual volumes which span physical devices. Details the SANavigator storage management console from Connex. (MEM)

Descriptors: Information Storage; Mass Storage; **Storage** **Area** **Networks** ; Hierarchical Storage Management; Client-Server Computing; Ethernet; Shows

Identifiers: Adaptec; Microtest; Procom Technology; StorêAge Networking Technologies; Connex

17/5/8 (Item 3 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00608018 00PIO8-006

Gateway Solo 3300, Solo 9300XL

Labriola, Don

PC Magazine , August 1, 2000 , v19 n14 p176-177, 2 Page(s)

ISSN: 0888-8507

Company Name: Gateway

URL: <http://www.gateway.com> <http://www.gateway.com>

Product Name: Gateway Solo 3300; Gateway Solo 9300XL

Languages: English

Document Type: Hardware Review

Grade (of Product Reviewed): C; B

Geographic Location: United States

Displays a comparative review of two laptop computers from Gateway of **San** Diego, CA (800, 605). Shows a mixed review of Gateway Solo 3300 (\$2,748). Spotlights its 500MHz Pentium III processor, 11.5GB hard drive,

rugged magnesium case, VGA output capabilities, and integrated **Ethernet** . Indicates no significant **drawbacks** . Received the rating of three on a scale ranging from one to five. Presents a favorable review of Gateway Solo 9300XL (\$4,145). Cites its 700MHz Pentium III processor, 15.8-inch active matrix display, bidirectional S-Video and FireWire interfaces, five hours of battery life, and wireless PC Card Ethernet. Mentions, however, that other 700MHz Pentium III-based laptops bested it in performance. Received the rating of four. Concludes that both are marvels of form and function, and should be part of potential buyers' short list. Includes two product summaries. (MEM)

Descriptors: Laptop Computers; Portable Computer; Mobile Computing; Benchmark Testing; Enterprise Computing; Client-Server Computing; Wireless Communication

Identifiers: Gateway Solo 3300; Gateway Solo 9300XL; Gateway

17/5/9 (Item 4 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00606614 00EW07-401

A shift in storage -- Fibre Channel gives ground to IP for managing distributed data

Lelii, Sonia R

eWeek , July 31, 2000 , v17 n31 p1, 24-25, 3 Page(s)

ISSN: 0740-1604

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

Reports that storage vendors and information technology (IT) organizations are exploring storage over Internet Protocol (IP). Cites the lack of an interoperability standard for **storage area networks (SANs)** and the increasing need to push data across a wide area networks (WAN) as factors in the interest in IP storage management. Explains that Fibre Channel became a victim of dueling standards efforts that have fractured the promise of interoperability and hampered the deployment of **SANs** . Says that storage over IP offers time-to-market, management, interoperability, cost, and other **benefits** over **Fibre Channel** for distributed storage. Mentions that storage over IP raises standards-relate issues that must be addressed before storage and networking ven make it the connection of choice among storage networks. Includes a sidebar, a photo, and two charts. (MEM)

Descriptors: **Storage Area Networks** ; Internet Protocols; Information Storage; Hierarchical Storage Management; Standards; Interoperability

17/5/10 (Item 5 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00604896 00TV06-009

InfiniBand : a paradigm shift from PCI -- The transition from bus to fabric promises to be a major industry undertaking

Heil, Tom

Computer Technology Review , June 1, 2000 , v20 n6 p46-47, 2 Page(s)

ISSN: 0278-9647

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

Discusses some of the challenges facing a shift from **PCI** bus architecture to the **InfiniBand** switched fabric architecture. Says that a complete solution will consist of pieces from many vendors, so specification and interoperability issues will cause delays. Claims that the viability of a unified **SAN** model is still in question. Notes that is it not clear what value **InfiniBand** can bring to the desktop and workstation segments. Adds that early-market **InfiniBand** offerings can not compete with the **cost** and performance of a simple **PCI** adapter. Contends

that PCI will enjoy a significant volume edge for many years. States that the software infrastructure will also require cooperation among many participants. Concludes that the biggest hurdle to InfiniBand will be overcoming the incumbent technology and proving itself. (amg)

Descriptors: Server; Architecture; Bus; Price

17/5/11 (Item 6 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00602669 00PK05-015

Alacritech saves CPU space -- Although adapters can't match Gigabit Ethernet speeds, they cost less

Baltazar, Henry

PC Week , May 1, 2000 , v17 n18 p75, 1 Page(s)

ISSN: 0740-1604

Company Name: Alacritech

URL: <http://www.alacritech.com>

Product Name: Alacritech 100x4

Languages: English

Document Type: Hardware Review

Grade (of Product Reviewed): B

Geographic Location: United States

Presents a favorable review of the Alacritech 100x4 (\$599 per card) a server adapter from Alacritech Inc. of San Jose, CA (408). Explains this is a quad-port card which utilizes the Session Layer Interface Card (SLIC) to offload networking tasks from server CPUs. Notes it is competitively priced, a solid performer. Points out it will provide a solid performance using only a single PCI slot. Warns its level of success was directly dependent on the request sizes. Says there is only one Windows NT driver available for the device. Concludes this is a good server adapter solution for thin rack-mount Windows NT servers. Includes one product summary. (kgh)

Descriptors: Adapters; Server; Network Management; Networks

Identifiers: Alacritech 100x4; Alacritech

17/5/13 (Item 8 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00553364 99TV11-010

Implementing fibre channel strategy for tape backup

Petrocelli, Tom

Computer Technology Review , November 1, 1999 , v19 n11 p46-49, 3 Page(s)

ISSN: 0278-9647

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

Examines the **benefits** to be derived by using **fibre channel** technology for new tape backup system architecture. States that improvements in overall system performance and reductions in total cost of ownership will be realized if a migration strategy from the current server and local area network (LAN)-oriented backup systems toward a fibre channel-based shared tape system is implemented. Claims that by extending the lifetime of existing assets, while increasing overall system performance and reducing operating costs, a better return on investment will also be realized. Concludes that end-users and companies alike will be served better by experiencing less disruption in their overall systems and, hence, regular business operations. Concludes that for this ultimate reason, implementation of this strategy is worthwhile. Includes three diagrams. (pe)

Descriptors: Backup; Storage Area Networks ; Fiber Distributed Data Interface; Fiber-optics

17/5/14 (Item 9 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.
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00549960 99PK10-208

SCSI still kicking in bus battle

Lelii, Sonia R

PC Week , October 18, 1999 , v16 n42 p1, 18, 2 Page(s)

ISSN: 0740-1604

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

Discusses the development of a faster bus interface technology called Ultra 160 SCSI. Says several **benefits** over its rival, **Fibre Channel** , include compatibility with older versions of technology and a data transfer speed of 160MB per second, compared to Fibre Channel's current top transfer rate of 100MB. Cites one CTO who notes that SCSI's performance doubles every two years. Says each SCSI channel can connect to 15 devices, but each Fibre Channel loop can hook up to 126 devices. Says **Fibre Channel** 's main **advantage** is an ability to extend 50 kilometers or more, while SCSI is limited to a few hundred meters. Indicates that distance is a critical feature for **storage area networks** . Notes that International Data Corp estimates Fibre Channel sales will rise at an annual growth rate of 138.5 percent and reach 11.4 million units sold in three years, while SCSI sales will rise 6.1 percent, with 16.7 million units (sps)

Descriptors: Bus; Product Development; Interface; Speed

17/5/16 (Item 11 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.
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00540265 99EM07-003

Up the SAN -box -- Fibre channel and new directions in network storage

Doering, David

EMedia Professional , July 1, 1999 , v12 n7 p50-55, 6 Page(s)

ISSN: 1090-946X

Languages: English

Document Type: Articles, News & Columns

Geographic Location: United States

Discusses the **storage area network (SAN)** concept. Examines how **SANs** work, where storage bottlenecks are, and some solutions. Explains that each device connects directly to the network cable, as would occur with network-attached storage (NAS), but this network cable is accessed only by a set of network servers. Adds that the loss of one of these servers does not prevent the remaining servers from accessing the **SAN** -attached drives, noting that the Fibre Channel loop itself can be broken and access can continue utilizing the self-healing capabilities of the protocol. Remarks that it is still not the preferred solution because as a destination, 120mm optical drives on a **SAN** have various limitations from capacity to speed to **limitations** inherent in the **Fibre Channel SAN** itself. Recommends **SAN** as a useful addition to enterprise RAID and tape backup, due to its universal server access, speed, and abundant hardware support. Includes two diagrams and a list of references. (KMH)

Descriptors: Mass Storage; Cables; Network Server; Information Storage; RAID; Backup; Fiber Distributed Data Interface

17/5/17 (Item 12 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.
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00420926 96MA04-101

Speedy Reply boards put Pentiums on PCI

Norr, Henry

MacWEEK , April 8, 1996 , v10 n14 p1, 70, 1 Page(s)

ISSN: 0892-8118

Company Name: Reply

Product Name: DOS on Power Mac **PCI**

Languages: English

Document Type: Product Announcement

Hardware/Software Compatibility: Macintosh

Geographic Location: United States

Announces the availability of DOS on Power Mac **PCI** (\$895 base price), DOS compatibility cards for the Macintosh, from Reply Corp. of San Jose, CA (800, 408). Says the cards will offer Pentium processors ranging in speeds from 100MHz to 200MHz, DIMM sockets supporting up to 128MB of dedicated DRAM, and a SIMM socket for L2 caching. Adds that they will accept a module that will provide serial and parallel ports and SoundBlaster-compatible audio. Notes that Macintosh products accounted for 30 percent of Reply's \$20 million revenue in 1995, a segment that is expected to increase by \$10 million in 1996. Also says Apple and Orange Micro Inc. of Anaheim, CA, are working on **PCI**-based DOS compatibility cards. (dpm)

Descriptors: Interoperability; Board; Macintosh; DOS; Pentium

Identifiers: DOS on Power Mac **PCI** ; Reply

17/5/20 (Item 15 from file: 233)

DIALOG(R)File 233:Internet & Personal Comp. Abs.

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00313332 93MA05-418

Asante Ethernet hub a smart choice

Oski, Jonathan

MacWEEK , May 31, 1993 , v7 n22 p35, 37, 2 Page(s)

ISSN: 0892-8118

Company Name: Asante Technologies

Product Name: Asante 1012 with AsanteView

Languages: English

Document Type: Hardware Review

Grade (of Product Reviewed): b

Geographic Location: United States

Presents a favorable review of AsanteHub 1012 with AsanteView (\$1898 as tested), an intelligent hub from Asante Technologies Inc. of San Jose, CA (800, 408). Says AsanteHub features 12 RJ-45 ports, an RJ-21 port, an uplink port, and RS-232 ports; but the hub has an **Ethernet**-only **limitation**. Also says the AsanteView network-management software offers performance monitoring, fault reporting, and complete network monitoring; it can also retrieve information of SNMP devices on a network. Given a rating of 'Very Good.' Includes a table, a screen display, and a score card. (tbc)

02020831 53637729

InfiniBand--a look ahead

Heil, Tom

Computer Technology Review v20n4 PP: 50 Apr 2000 ISSN: 0278-9647

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ABSTRACT: The leaders in the Intel Architecture and RISC-Unix open systems markets have come together to define InfiniBand, a Switched Fabric I/O Standard slated to replace the shared bus for attaching I/O to servers. A switched fabric connects processor and I/O nodes via a network of switches and point-to-point links.

TEXT: The leaders in the Intel Architecture (IA) and RISC-Unix open systems markets have come together to define InfiniBand, a Switched Fabric I/O Standard slated to replace the shared bus for attaching I/O to servers. A switched fabric connects processor and I/O nodes via a network of switches and point-to-point links. The shift from bus to fabric is a profound reset of server architecture with farreaching implications for the way systems are designed, built, and sold. The promise is enduser systems that are simpler, cheaper, more reliable, and easier to expand and service.

The leaders of the open systems market backed InfiniBand, which might imply broad adoption of InfiniBand as a PCI replacement. It will happen quickly. What could go wrong? Surprisingly, the answer is plenty. Getting InfiniBand defined and working is just the first step. Then, comes the real work replacing PCI. Economics will shape the outcome and the bus may prove surprisingly resilient.

Today's Bus-Based Server Architecture

A brief review of today's server architecture, depicted in Fig 1, provides a reference in which to understand InfinBand. The basic building block is an uni-processor or Symmetric Multiprocessor server, functioning either stand-alone or as a node in a multi-server cluster. Cluster configurations are increasingly used in data center, ISP, and electronic commerce applications. The server node consists of CPUs, memory, and I/O bridges, connected via a proprietary memory bus or crossbar. The I/O bridges implement one or more PCI (or PCI-X) segments, each supporting one to five I/O slots. (The higher the segment frequency, the fewer the slots.)

Fig 1 depicts the three main server I/O functions: external communications (e.g., the Internet), data storage and retrieval, and, in the case of a cluster, server-to-server InterProcessor Communications (IPCs). Typically, all are implemented via PCI adapters, using either a Host Adapter Board (HAB) or chip on the motherboard.

A wide variety of PCI HABs exists because of the wide variety of external communications interfaces such as Ethernet, Ti, and ATM. HABs attach the server to LAN/WAN infrastructure elements like switches and routers. Storage is a bit simpler. Two interfaces, SCSI and Fibre Channel, dominate the IA and RISC/Unix server markets. A SCSI or PCI RAID adapter connected directly to hard drives may suffice in a small, standalone server. Fig 1 depicts Fibre Channel HABs connected to a SAN.

IPC networks vary significantly, depending on cluster usage. In the simplest case, a point-to-point Ethernet link is used to exchange heartbeat messages in a two-node availability cluster (each backs the other in case one fails). Generally, however, multiple servers must work together effectively on parallel or partitioned applications, which puts tremendous demands on the IPC network in terms of data throughput and server-to-server message latency. These demands are beyond the capability of standard LAN technologies.

Unlike LAN/WAN and storage, there has been little in the way of broadly adopted IPC standards or third-party merchant solutions. OEMs have, instead, relied on internally developed solutions like Compaq's ServerNet. Recently, the Virtual Interface (VI) standards initiative defined an architecture that allows applications on different server nodes to exchange messages and data directly without going through the operating system, eliminating much of the overhead associated with standard LAN protocols. VI has been mapped to a variety of hardware layers. Also, third-party solutions explicitly targeting cluster IPC are beginning to surface. One example is GigaNet's cLAN (for Cluster LAN) family, a line of VI-based PCI HABs and switches.

Switched fabrics are not new. Fibre Channel, ServerNet, and CLAN are all switched fabrics. Proprietary fabrics have existed in enterprise markets for years. The InfiniBand vision, though, is much broader than that of any of its switched-fabric predecessors.

Tomorrow's InfiniBand Switched Fabric Architecture

Now, compare Fig 1 with the InfiniBand architecture depicted in Fig 2. The first thing to notice is that there are no PCI slots or HABs. An InfiniBand bridge has replaced the PCI bridge in the host chipset. The server has collapsed to nothing more than processors, memory, and InfiniBand I/O ports. (Each server node needs local I/O like boot drives to function.)

To replace PCI, InfiniBand must, by definition, be a true unified systems area network, not just a Storage Area Network like Fibre Channel. Like PCI, a unified network can transport any/all traffic types: LAN/WAN, cluster IPC, and storage. A user may allocate specific InfiniBand channels to specific functions, but it's a configuration rather than a technology choice.

The nature of buses is such that PCI slots and HABs must physically reside in the server enclosure with CPUs and memory. In contrast, InfiniBand decouples I/O from the server. The PCI HAB is replaced by the Target Channel Adapter (TCA) board, which plugs into a switched fabric, rather than a shared bus backplane. TCAs do not have to physically reside in the server enclosure. Separate enclosures just for TCAs, especially in rack mount environments, will emerge. Of course, standalone servers with everything in one cabinet will continue to exist, but it will become a packaging choice.

In contrast to PCI, InfiniBand is defining TCA slots and boards for easy, onedimensional insertion and removal. This will allow boards to be added and removed without having to open the enclosure, similar to the way individual drives are accessible in a disk array.

In some cases, there will be no need for a host or target board-level adapter at all. In Fig 2, no adapter exists between the server host chipset and the RAID system or LAN switch with a native InfiniBand interface. This will become increasingly true as the InfiniBand market matures.

Fig 1

Fig 2

Tom Heil is the senior systems architect for the storage components division at LSI Logic (Fort Collins, CO).

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This article is the first in a three-part series. The second part will appear in the May issue of CTR.

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InfiniBand: A Paradigm Shift From PCI

The transition from bus to fabric promises to be a major industry undertaking.

by Tom Heil

This article is the third in a three-part series. The second part appeared in the May issue of CTR.

InfiniBand is a compelling vision with the potential to revolutionize server architecture. As discussed last time, InfiniBand is driven by the pressing need to improve the scalability and availability of servers under tremendous pressure from Internet growth and it is backed by the industry heavyweights. The bus is history, right?

Not so fast. Despite its limitations (particularly in scalable environments) PCI is fast (getting faster with PCI-X), simple, and cheap. InfiniBand is not just a significantly more complex technology, but a major computer architecture paradigm shift. The transition from bus to fabric promises to be a major industry undertaking. This article will explore some of the challenges InfiniBand faces and the impact these may have on how, where, and when the technology is adopted.

InfiniBand Adoption Challenges

The following is not all-inclusive, but simply meant to convey some of the complexities inherent in the move from today's bus architecture to tomorrow's switched fabric architecture.

- **Specification Breadth and Complexity:** Before converging on InfiniBand, the two competing switched fabric proposals—NGIO and Future I/O—addressed opposite ends of the price/performance continuum. NGIO was lean and cost-focused with an eye towards enabling relatively rapid PCI replacement in volume segments. Future I/O was performance-oriented and feature-rich, focused more on enterprise clustering than on immediate PCI replacement. It's no accident the Future I/O camp was the primary driver of PCI-X and the NGIO camp its primary detractor. This wide span of objectives is now under the common InfiniBand umbrella.

Is the vision too broad? Will features needed for higher end, lower volume applications put significant cost burden on lower end implementations? One of the key

reasons behind PCI's success was its near exclusive focus initially on the high volume PC desktop. PCI shied away from features that might have made it more server and workstation friendly, but would have compromised PC cost structure. Now, practically all IA and RISC/Unix servers and workstations use PCI, not because it is optimal in these segments, but because the economics of a technology backed by desktop volumes is hard to resist.

The IA market is tremendously interdependent. A complete InfiniBand solution will consist of piece parts—both hardware and software—from many, often competitive, vendors. Add this to the technology's intrinsic complexity and the risk of months, perhaps years, of specification "interpretation" issues, interoperability struggles, and the like is apparent.

- **Viability of Unified SAN Model:** InfiniBand is a unified System Area Network that promises to host any/all server I/O traffic types: LAN/WAN, cluster IPC, and storage. Although intuitively appealing and essential to PCI re-

placement, viability is not yet proven. There have been several "grand unification" attempts in the past—Asynchronous Transfer Mode (ATM) and Fibre Channel, for example—that, like InfiniBand, started out as "universal transports" destined to consolidate LAN, WAN, storage, voice, video, etc. and, in so doing, render all other wires obsolete. ATM and Fibre Channel found their niches, but neither came close to initial "all traffic on one wire" expectations. The devil is in the details. A universal transport cannot optimize every application. For example, there's inherent tension between large-block sequential I/O (typical of storage) and small-message random I/O (typical of IPC). Universal implies trade-offs, the impact of which won't be known for some time. The question is how much of a hit (relative to separate single-function networks) is the industry willing to pay for the benefits of a unified network?

- **Cost Structure:** As previously mentioned, PCI's popularity in IA and RISC/Unix servers is based on the economies-of-scale associ-

ated with its dominance in desktops. There are segments where InfiniBand's value proposition will more than compensate for a higher technology cost structure; the ISP who's adding servers by the truckload, for example. But what about desktops, workstations, and entry servers? It's not clear what compelling value InfiniBand brings to these segments. Adoption then is going to be highly dependent on driving the cost delta between InfiniBand and PCI to near zero. (It should be noted too that bus performance may be hard to beat in this class system where latency is often more important than bandwidth scalability.)

The problem is that these entry systems represent, by far, the lion's share of system unit shipments. The High-Density Rack Mount (HDRM) environment where InfiniBand delivers clear value is growing fast, but is still small by comparison. InfiniBand may gain a foothold in HDRM, but if it does not branch out and dislodge PCI in high-volume segments, PCI will continue to outship InfiniBand by perhaps an order-of-magnitude or more. The market could fragment the way it did with SCSI and IDE disk drives. SCSI was always the more capable, scalable, feature-rich interface, but IDE drives still outship SCSI by an order-of-magnitude. Relatively speaking, only a small portion of the market needs and is, therefore, willing to pay a premium for SCSI. Likewise, InfiniBand is the more capable, scalable, feature-rich interface, but what is the premium and what segments will pay it? As long as PCI remains a high-volume opportunity, even scalable server OEMs may find it difficult to ship systems without at least a

few PCI slots, to tap into the plethora of cheap PCI I/O.

So, can InfiniBand ever be as cheap as PCI? Maybe, but it will be difficult and will take time. Beyond the inherent costs of developing and deploying a new technology, the complexity of InfiniBand relative to PCI carries intrinsic cost. Granted, buses are pin-intensive, but logically, they are simple: a bunch of latches, buffers, and decoders managed by hardware state machines. In contrast InfiniBand is a full network protocol, requiring significant processing power and memory to manage queues, process messages, handle exceptions, etc. Over time, parts of the protocol stack will become automated to drive performance up and cost down, but initially, a lot of the work will be processor-based.

This may not be an issue on the host side since the host CPU can pick up the load. Targets, though, are another matter. Today's PCI-SCSI adapter is simple and cheap (often sub \$100), little more than a single IC and connectors. In contrast, an early-market InfiniBand-SCSI TCA will likely consist of an InfiniBand-PCI front-end chip, a processor complex like i960 or PowerPC (with memory), and a PCI-SCSI back-end chip. This is fine for a RAID controller or storage router type product where the processor adds significant value, but cannot compete with the cost and performance of a simple PCI adapter. (A discrete processor-based TCA has to double buffer data, adding latency.) Ultimately, TCAs will have to be driven to a single chip before performance and electronics cost can approach PCI parity. Then, single chip versions of all required TCAs (SCSI, Fibre Chan-

nel, Ethernet, etc.) from multiple sources will be needed before hosts can safely do away with PCI slots.

Even if electronics achieve cost parity, a TCA board is inherently more expensive than a PCI adapter due to the TCA's mechanical canister that makes it customer replaceable. This is a terrific architecture attribute and an essential element of the InfiniBand value proposition, but does add to material and manufacturing cost.

Then, there's the switch. For InfiniBand to replace PCI, one would expect InfiniBand's "cost per port" to meet or beat PCI's "cost per slot." Today, switches connect boxes. For InfiniBand to replace PCI, switches must push beyond the box-to-box fabric and into the boxes themselves. A new class of inexpensive "edge" or "backplane" switch ICs is needed to bring the switched topology right to individual I/O devices. This is a new cost and architecture paradigm for switches. Recall that Fibre Channel Arbitrated Loop came about in response to the realization that switch cost was going to impede Fibre Channel adoption in more cost sensitive applications.

The most difficult cost structure issue, though, is economies-of-scale. If InfiniBand drove higher volume from day one, technology cost issues would take care of themselves, but it's the other way around. PCI is cheaper and will enjoy a significant volume edge for many years after InfiniBand's debut. PCI's unprecedented success gives it an economic inertia that will be difficult to overcome.

• **Software:** InfiniBand is as profound a paradigm shift to software as it is to hardware. Modular, "rack and stack" computing—

where perhaps even end-users can safely add or replace servers and I/O adapters—has a hardware and software component. Hardware is arguably the simpler problem. The enabling software infrastructure is a major undertaking, once again requiring cooperation between a broad base of participants. Imagine an HDRM environment with dozens of clustered servers, RAID controllers, LAN routers, and TCA enclosures. Someone replaces an InfiniBand-SCSI TCA. Who detects the event? Who is informed of the event? Which servers had access to the device? What if any of them had work in progress? How do the servers re-establish connection to the new device? If the new device is a newer version or from a different vendor, how do the servers get the appropriate driver? If multiple servers share the device, how do they coordinate access? These types of problems are not new, but they are complex and will require significant cross-industry coordination (e.g., standards) to deliver the value, especially in the multi-vendor environment needed to drive down technology cost.

Take the transition from PCI to TCA device drivers, for example. Today, I write a driver to my PCI chip or adapter. Tomorrow, I will have to write it to some form of transport services layer that insures my message gets to my device on the other end of the network. Also I have to deal with things like connection management, lost packets, and device sharing, none of which I had to deal with in the simple, cozy world of close-proximity, in-box PCI adapters. What's more, my device on the other end probably sports a hefty firmware component given the

shared, intelligent I/O nature of InfiniBand. The days of simple register reads and writes are over.

• **Incumbent Technology Evolution:** The toughest of all hurdles may be the unwillingness of incumbent technologies threatened by InfiniBand (and companies vested in them) to roll over and play dead. The burden-of-proof always rests on the challenger to demonstrate a value sufficiently compelling to overcome intrinsic incumbent advantages like maturity, multi-vendor availability, installed base, and supporting infrastructure and the bar never sits still. InfiniBand clearly sets a new watermark for architectural value, but in all practicality, it's still two to three years away. Meanwhile, PCI, Fibre Channel, SCSI, Ethernet, etc. will all press on per their respective roadmaps, steadily adding performance and value, and closing in on this new watermark. When NGIO first came on the scene, 66MHz PCI was the bandwidth watermark. Since then, this has doubled with PCI-X and could well double again before InfiniBand achieves critical mass. Also, capabilities, like hot-plug and rack-friendly form-factors, are addressing many of the issues that make InfiniBand so attractive. These incremental solutions may not be as elegant as InfiniBand, but are available sooner at lower cost and use technology that the industry already knows. The longer it takes InfiniBand to reach critical mass, the more time incumbents have to close the gap. If, for example, Fibre Channel achieves 5Gbps or

10Gbps before InfiniBand has critical mass, will 2.5Gbps InfiniBand still be competitive?

InfiniBand Adoption

Given all this, how's InfiniBand likely to emerge? It probably helps to break the market into two categories: Internet-driven HDRM and traditional (everything else). By far, the most aggressive driver of HDRM is the Internet. More than any other segment, ISPs are crashing against the boundaries of today's architecture. The bus is especially problematic in this environment. Also, you don't need PCI slots in every server to take advantage of low-cost PCI adapters. It should be easy to provide dedicated "PCI adapter pool" servers in the room. If a slot-less server needs a PCI adapter, it gets assigned one from the pool and "redirector" software passes I/O requests over InfiniBand to the pool server where the adapter and driver reside. This isn't pretty, but may suffice until all needed I/O is available natively and cost-effectively on InfiniBand.

Outside of Internet-driven HDRM (without which InfiniBand might not ever get off the ground), expect InfiniBand adoption to be much more gradual. Traditional clustered enterprise servers have to date been without a dominant standard IPC solution, meaning each OEM has had to carry the cost of its own proprietary solution. This seems like relatively low-hanging fruit for an early InfiniBand foothold. Over time, you would expect per-

formance-critical RAID storage and LAN/ WAN connections to move onto InfiniBand, especially as host chipset implementations prove themselves faster than PCI-based InfiniBand adapters. Until then, what's the point, since these systems will likely have PCI slots for many years to come. As long as "hybrid" systems—systems with native InfiniBand channels and PCI slots—are the norm, there will have to be a compelling value to put a particular function on InfiniBand, since PCI versions of that function will be more mature, more broadly available, and cheaper.

As you move down the traditional curve into standalone mid-range and finally entry servers and workstations, the InfiniBand value proposition gets progressively less compelling. Accordingly, adoption rates become increasingly dependent on maturity, solution availability, and cost structure parity. It's difficult to predict just how far down InfiniBand will ultimately go. Will it go all the way down and truly obsolete the bus? Or will it stop short of entry server and workstation segments, resulting in a perpetual split where switched fabrics are the way to do scalable servers and buses the way to do entry servers and workstations? If InfiniBand doesn't capture the entry level, perhaps in time, some new I/O paradigm from the desktop or consumer world will.

The shift from PCI to InfiniBand is a complex undertaking that could take the better part of a decade to complete. A lot of things

have to come together and it will be years before we know whether PCI can truly be retired or whether it will live on indefinitely, at least in some segments.

It's probably inevitable that at some point in the future, all I/O will exist at the end of a point-to-point link. The modularity, scalability, and ease-of-use attributes of switched fabrics and point-to-point topologies are just too attractive and the cost traditionally associated with such architectures comes down with each successive semiconductor technology generation. Given all the InfiniBand hype these days, it might be easy to overestimate its immediate market potential. It would be unwise, though, to underestimate the long-term potential of switched fabric architectures, like InfiniBand, to become pervasive throughout all of computing.

Tom Heil is the senior systems architect of the storage components division at LSI Logic (Fort Collins, CO).



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Chapter 1

Introduction

InfiniBand architecture is a new server I/O technology that improves the way servers interconnect with I/O devices and with each other. It is one of the first new technologies of the millennium, a revolutionary new technology that transitions us into the 21st century.

I/O (which stands for Input and Output) refers to the ability to move data in and out of the processor/memory complex of a compute node. I/O takes place on several levels; InfiniBand architecture addresses the lower layers, defining an I/O interconnect and its transport protocols. Typically, high volume servers have used I/O technology, such as PCI, developed for desktop computers. PCI devices include storage and network adapters that enable the computer to attach to peripheral buses such as Fibre Channel, Parallel SCSI, and Ethernet. In this respect, InfiniBand architecture is a PCI replacement, promoting faster and more powerful adapters.

However, InfiniBand is much more than a PCI replacement. It provides many features and capabilities previously found only in mainframe architectures and it provides advanced capabilities necessary for server clusters. It also allows I/O adapters to move out of the server the same way that Fibre Channel devices reside in independent chassis and racks. Thus, storage arrays (RAID, etc.) can connect directly to InfiniBand fabric. In fact, some analysts believe InfiniBand could eventually become a storage interconnect like Fibre Channel and iSCSI, due to performance, cost, interoperability, etc.

The two primary goals driving this new technology are: overcoming PCI limitations (performance bottlenecks, expandability, scalability, etc.) and standardizing the proprietary technologies emerging in the clustering space (e.g., Servernet, Myricom, Giganet, etc.). Of course, it brings many new challenges and it changes the way we design, build, and incorporate server products and build enterprise infrastructures.

InfiniBand architecture is a rich and complex technology designed to overcome existing barriers, and at the same time, to provide the framework for new and enhanced features and capabilities. Not only

does InfiniBand provide an improved I/O interconnect and communication infrastructure, but it also changes the way we build and manage data centers.

Many senior architects from the world's leading computing companies collaborated on the specification to advance server I/O well into the future. With the specification process completed, the time has come to produce useful and valuable products and solutions.

Yes, it is a complex architecture, but it doesn't have to be difficult. The key is in understanding both the capabilities and the goals of the architecture. In particular, product vendors need to understand strengths and weaknesses so they can provide optimum products. End-users¹ must plan properly to take full advantage of InfiniBand products.

Most new technologies have underlying principles that are not obvious just from reading the specification, and InfiniBand architecture is no exception. First, industry specifications are significantly different from product specifications; a product specification tells exactly what is being built or purchased, while an industry specification tells what is or is not allowed. In many cases, what an industry specification doesn't say is just as important as what it does say.

While product engineers and site managers are concerned with "*where the rubber meets the road*,"² architecture has been described as "*where the rubber meets the sky*." It is important to understand the reason for this difference. In developing a new technology that will evolve and have a long lifetime, the architects must look into the future and build in features not necessarily relevant in today's products. Again, InfiniBand architecture is no exception. However, "evolve" is the key word. Thus, this book provides a road map identifying near-term and long-term goals of the architecture.

Another observation is that the scope of InfiniBand architecture covers a large range and spans many market segments (storage, communications, networking, server platforms, mainframe computing, etc), from standard high-volume server products to high-end server solutions. This book

¹ Data center managers, MIS managers, IT managers, network engineers, department managers, etc. are the end-users or customers of the technology and play an important role in how well InfiniBand architecture progresses.

² For those not familiar with this phrase, it refers to tires on a vehicle, and means where the real work is done.

discusses how the various features of the InfiniBand architecture apply to those market segments.

Scope

The goals of this book are:

- Explain the features and capabilities of InfiniBand architecture.
- Explain various deployment strategies and provide site managers with the knowledge they need to make intelligent decisions on how to adopt, purchase, deploy, and manage InfiniBand architecture based products and solutions.
- Identify various market segments and identify how InfiniBand architecture applies to them.
- Guide hardware and software developers through the InfiniBand architecture, tying architectural concepts together, setting practical expectations, and identifying responsibilities for hardware vendors, software vendors, operating system vendors, and platform vendors.
- Remove the mysteries of the architecture and promote the values that enable application developers to take full advantage of the technology.
- Educate product architects on how to make optimum use of InfiniBand features.
- Clarify the roles and expectations for the various product developers:
 - Channel adapter vendors.
 - Server platform vendors.
 - Operating System Vendors (OSVs).
 - Independent Hardware Vendors (IHVs).
 - Independent Software Vendors (ISVs).
 - Applications as an IPC³ client.
 - Management applications.
 - Network service providers.

³ IPC – Inter-Process Communication is the ability for processes on different nodes to directly communicate with each other including sending data and accessing each other's memory.

The bulk of this book focuses on typical solutions and common practices for the early adopter; i.e., the first few years of InfiniBand deployment in every-day, practical environments. InfiniBand architecture has potential that goes beyond these bounds.

The ultimate goal is enabling multi-vendor InfiniBand-based products that work and play well in a heterogeneous environment.

A Brief History

InfiniBand architecture resulted from two industry initiatives, Next Generation I/O (NGIO) and Future I/O. Intel started working on what eventually became InfiniBand as early as 1996, when a team of architects was asked to develop an I/O technology based on the Virtual Interface (VI) Architecture.⁴ The purpose of this effort was twofold:

1. Produce a serial interconnect that would permit I/O to move away from the CPU/memory complex.
2. Have that same serial interconnect provide a VI-compliant interface for inter-process communication (IPC) between applications on different servers.

The whole concept was based on VI architecture for communication between hosts and I/O pass-through to PCI cards in a remote chassis (i.e., a transparent extension to PCI). It was more than just serial PCI, but it still had many of the same characteristics and limitations.

After tedious evaluation and designing, someone asked the architects if they thought it was the right architecture. None of the architects thought so. For various reasons, they all thought that for such a significant effort, it just didn't provide solutions to the other I/O problems that servers faced, such as improving scalability, serviceability, and reliability. Additionally such an effort should provide a strong foundation for emerging concepts such as user level I/O, third party I/O, and device sharing.

To make a long story short, they were then asked to develop an I/O technology that would be worthy of the investment that Intel would ask

⁴ VI Architecture Specification V1.0. For more information, see the VI Developers' Forum (VIDF) web site <http://www.vidf.org>. The VI specification can be downloaded from <http://www.viarch.org>. The developer guide for VIPL, "Intel VI Architecture Developer's Guide V1.0," can be downloaded from http://developer.intel.com/design/servers/vi/developer/ia_imp_guide.htm.

the industry to make. Other companies also had similar experiences, recognized the same problems, came to the same conclusions, and wanted to collaborate in developing a common solution. This effort, soon named Next Generation I/O (NGIO), became an industry initiative led by Dell Computer, Hitachi, Intel, NEC, Fujitsu Siemens, and Sun Microsystems. NGIO grew to over 100 companies.

In this same time frame, another initiative known as Future I/O (FIO), led by IBM, Compaq, Adaptec, 3Com, Cisco, and Hewlett-Packard emerged. FIO also grew in size with many companies belonging to both initiatives. These two initiatives, NGIO and FIO, had for the most part a common set of goals, but differed in some key areas. In general, NGIO focused on the standard high volume (SHV) server market while FIO targeted high-end platforms.

Both camps worked hard to be the first to produce a finished specification, knowing that the industry had no room for two new competing technologies. In the end, they both realized that fragmentation of the industry was the worst possible outcome, so over the summer of 1999, they worked out plans to merge the two initiatives. By October 1999, the InfiniBand Trade Association (IBTA) formed. Rumor has it that the name comes from infinite-bandwidth,⁵ a name that the architects on both sides equally disliked.

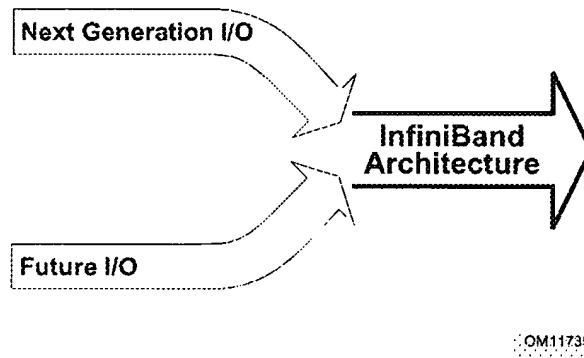


Figure 1.1 Roots of the InfiniBand Architecture

⁵ InfiniBand is a trademark. It doesn't officially stand for anything except the name of the architecture and the name of the trade association that produced the architecture.

Both teams had a lot in common. Both initiatives were based on the same technologies and they both borrowed the same concepts from existing technologies – switched fabric, signaling characteristics (Fibre Channel, Ethernet), mainframe channel technology, proprietary cluster interconnect, and VI architecture. For example, VI architecture, which stated in Intel labs and was jointly developed with Compaq and Microsoft, standardized the interface to cluster interconnects and promoted Inter-Process Communication (IPC). However, VI architecture is a software specification and both sides realized that VI architecture concepts needed to be pushed down as part of the transport and implemented in hardware.

The merge turned out better than anticipated, and the architecture ended up with far more capability than just the sum of the two original initiatives. It was the best of both technologies, and truly a collaborative, industry-wide effort. The InfiniBand Trade Association has seven steering committee members (Compaq, Dell Computer, IBM, HP, Intel, Microsoft, and Sun), 11 sponsor members (3Com, Adaptec, Agilent Technologies, Brocade Communication Systems, Cisco Systems, EMC, Fujitsu Siemens, Hitachi, Lucent Technologies, NEC, Nortel), and over 230 general member companies.

In October 2000, the InfiniBand Trade Association held its Fall Developers Conference announcing to the world that they had completed the *InfiniBand Architecture Specification* and it was available to the industry. That release (r1.0) consists of two volumes, architecture and electrical-mechanical. The specification was developed by 150 architects from over 30 companies and reviewed by more than 150 companies – an amazing feat to occur in just one year.

In June 2001, the IBTA released its first update of the specification (r1.0.a) that provides clarifications/errata updates. There are currently a number of Annexes under development as the architecture continues to evolve and grow.

That is the history of InfiniBand. The important point is that a significant number of senior architects from prominent companies collaborated to merge the best concepts into one common architecture. Now it's time to answer the question "Just what did they create?"